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[OFFICIAL NOTICE.]

Bound Volume, Proceedings New England Association of Gas Engineers.

NEW ENGLAND ASSOCIATION OF GAS ENGINEERS,
OFFICE OF THE SECRETARY,
NEW BEDFORD, MASS., Oct. 26, 1901.

A limited number of copies of the "Proceedings" of the New England Association of Gas Engineers, for the years 1900 and 1901, remain, and single copies can be obtained on application to the Secretary, who will mail them on receipt of $2. This volume contains several papers and the discussions thereon, and are of especial value for reference. The "Proceedings" of prior years will be published later, and the volumes will be of great value for any gas man's library.

N. W. GIFFORD, Secretary.

BRIEFLY TOLD.

"WHAT IS THE BUSINESS OF A GAS COMPANY?"—Well in the memory of our readers must be the quoted title, for such was the heading of the paper, read at the last meeting of the American Gas Light Association, by Mr. Franklin D. Moses, Chief Engineer of the South Jersey Gas, Electric and Traction Company: and the text of his paper was printed in the JOURNAL, dated October 21st last. A celebrated *bon vivant* of earlier days remarked that it was "A long time between the walnuts and the wine;" so we say now that it is not through our fault that the pickle of the paper by Mr. Moses was not followed earlier by the sparkle of the discussion thereon. In other words, we have to wait upon the supremacy of those who control the Association's affairs, from a councilmanic point of view, as to when and how the discussions upon papers read before the Association may be printed. Having had the assent of Mr. Moses to publish his paper after it had been read to the Association, we printed it as soon as possible. An abstract of the discussion on it appears in this issue. The author of the paper is a man who has had many peculiar experiences in his active connection with the gas industry of the States, and his connection therewith covers a period of two-score years. Further, his experience has not been confined to one works, to one set of capitalists or to one State; he has had trials of various kinds in the three instances set forth—in different works with various capitalists and in several States. So his knowledge of gas matters should be in a sense cosmopolitan; but one should never forget that cosmical conditions may in time become local. The general who happens to have conducted successfully a war against one enemy in one place may meet defeat in another campaign at a different point through having followed like tactics in each conflict, and thus it often happens with gas engineers who finish the financial conflicts that their employers map out. No one may truthfully deny that Mr. Moses is a successful constructor of gas works, nor may anyone truthfully say that he is not faithful to the interests committed to him, nor may it be said that he does not know how to make gas; but we do protest with Mr. Alten S. Miller—and Mr. Moses will know what it costs us to so say—with G. W. Clabaugh and others who took part in the discussion that gas for illuminating purposes is yet a pretty good thing. In fact, to our mind it is still the staple end of the business, so far as good, substantial

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profit is concerned; and in that belief we think we will have the support of the engineers most closely connected with the operation of the largest combined gas and electric plants in America. Gas for cooking and heating purposes, as the same is supplied in Greater New York, is all right, in comparison with gas for illumination, since on the three counts the rate is the same. And Mr. Moses would have been nearer to adding another commandment to his list had he reported that the people of Trenton and Camden, N. J., are quite unlike those who dwell between Camden and Baltimore. In other words, it is well to remember that that which loses in one place wins in another; and it is better still to remember that gas for lighting purposes has not been in any sense eclipsed, full or to the half, by the use of gas for any other end or aim whatever. Gas for general use is that which must be advocated, and the proper way to advance such generality is to name one price for a gas service of any sort, stipulating, though, that one price shall be the rate. Opposition schemes that have heretofore been successfully brought off have caused this condition to exist, in proof of which we refer to the respective experiences of Mr. A. S. Miller and of Mr. F. D. Moses. Replying to the query of Mr. Moses, we should say that in these days of cheap gas the business of a gas company would be served by doing the best it could, either from a lighting or other point of view.

NOTES.—We regret to report the death of Mr. James Goulden, a Director of the Port Huron (Mich.) Gas Company, whose demise occurred the morning of the 5th inst. He was a native of Sligo county, Ireland, having been born there July 22, 1829. He came to America in 1853, and in 1857 settled in Port Huron, where his course was such as to enable him to amass a competence without incurring the ill-will of any of his associates or fellows.——At the annual meeting of the Harrisburg (Pa.) Gas Company the following officers were elected--the affair was a mere formality: Directors, C. H. Bergner, H. A. Kelper, W. K. Alricks, J. D. Cameron, G. W. Reilly and F. A. Awl; President, C. H. Bergner; Treasurer, F. A. Awl; Secretary, Chas. B. McConkey.——Messrs. George McMillan and W. S. Cargill, of La Crosse, Wis., have perfected plans whereby the properties of the La Crosse Gas Light Company, the La Crosse Brush Electric Light and Power Company, of La Crosse, and the Edison Electric Light and Power, Company, of La Crosse, are to be consolidated. The succeeding corporation is to be known as the La Crosse Gas and Electric Company, and it is understood that much expenditure is to be made on plant extension account. ——The plant of the Mobile (Ala.) Gas Light Company is to be rebuilt --at least so says Mr. S. S. Rubira; but he has been saying that for 10 years!——The corporate name of the Fremont (O.) Gas Company has been changed to that of the Fremont Gas, Electric Light and Power Company. Under the Presidency of Mr. James T. Lynn the combined enterprise proposes to greatly advance the lighting service of Fremont. ——The Toronto (Can.) *Globe* remarks that the Consumers Gas Company, of that city, has had a "fairly profitable" year, which can be readily proven by an examination of the annual reports submitted by Manager Pearson to the Directors on the occasion of their 53d annual meeting, held the 28th ult. In the twelvemonth 1,565 new services have been put in and 6 miles of mains laid, making a total of more than 257 miles of mains. The average illuminating power of the gas has been over 20 candles. The output of gas for the past year amounted to 873,481,000 cubic feet, being 35,266,000 in excess of the previous year. The Company has this year 916 street lamps and 28,543 meters, against 1,001 street lamps and 26,982 meters last year. The revenue from gas rentals this year was $716,52[illegible].82, against $676,325.11 last year, an increase of $40,199.71. During the meeting it was stated that the consumption of gas for illuminating purposes had fallen off, and a partial explanation of this was considered to be the many patent burners in use, that act as gas regulators. In the street lamps, too, less gas was consumed, owing to the use of reflectors. For fuel purposes, however, gas had come into much greater use, this bringing up the total consumption. This increased expenditure is explained by the burning of retort benches during the year. The old Board of Directors was re-elected, as follows: Messrs. A. W. Austin, J. L. Blaikie, Henry Cawthra, Geo. R. R. Cockburn, M. A. Isaac, C. Gilmor, George Gooderham, James Henderson, M.A., D.C.L., Thomas Long, E. B. Osler, M.P., President, L. W. Smith, K.C., D.C.L., A. J. Somerville, Thomas R. Wood. At the subsequent meeting of Directors, Mr. Larratt W. Smith was elected President, Mr. G. R. F. Cockburn was elected Vice-President and Mr. W. H. Pearson was reappointed Treasurer, Secretary and General Manager. The receipts were $786,814, and the expenditure fell short of this by $282,837, interest on debentures bringing this up to $287,194. From this dividends amounting to $174,603 were paid, interest accounting for $2,388, and $110,249 going to profit and loss.

[LIMITED ABSTRACT—CONTINUED FROM PAGE 724.]

PROCEEDINGS TWENTY-NINTH ANNUAL MEETING AMERICAN GAS LIGHT ASSOCIATION.

HELD AT STEINERT HALL, BOSTON, MASS., OCTOBER 16 TO 18, 1901.

FIRST DAY—WEDNESDAY, OCT. 16—MORNING SESSION.

The reading of the reports of other special committees, including that of the Committee on Nomination of Officers, was deferred.

Mr. W. R. Beal, the First Vice President, assumed the Chair and the President read his

INAUGURAL ADDRESS.

[For President Pratt's inaugural address, see JOURNAL, Oct. 28, p. 684.]

COMMITTEE ON PRESIDENT'S ADDRESS.

Messrs. A. B. Slater, W. H. White and W. L. Cosgrove were appointed a committee to consider the address, with instructions to report their findings thereon in due and proper time.

Mr. C. H. Nettleton read the following

REPORT OF COMMITTEE ON NOMINATION OF OFFICERS.

The Committee on Nominations desire to report the following names:

President—Mr. William R. Beal, New York.
First Vice-President—Mr. Alten S. Miller, New York.
Second Vice-President—Mr. Rollin Norris, Philadelphia, Pa.
Third Vice-President—Mr. Edward G. Cowdery, Milwaukee, Wis.
Secretary and Treasurer—Mr. Alfred E. Forstall, New York.
Members of Council (to serve for 2 years)—Messrs. Charles R. Faben, Jr., C. J. R. Humphreys, Walton Forstall and Edwin E. Witherby.

CHARLES H. NETTLETON Chairman,
THOMAS G. LITTHEHALES,
WILLIAM H. CARTLEY
HENRY L. RICE
ISAAC C. BAXTER,
} Committee

ELECTION OF OFFICERS.

The report was received. The nominees having been balloted for were declared duly elected as officers of the Association for the coming year.

The officers-elect, on being introduced to the Association, expressed their appreciation of the honor conferred, and pledged their best efforts in the service of the Association during their respective official terms.

REPORT OF COMMITTEE ON UNIFORM SYSTEM OF ACCOUNTING.

Mr. A. C. Humphreys read the following report from above named committee:

Your committee was appointed under the following resolution passed at the last meeting:

"*Resolved*, That the present presiding officer appoint a committee of three to consider the question of a system of uniform accounts for gas companies, to co-operate with other committees of a similar nature from other public service corporations, and report their recommendations to this Association."

This resolution was passed in response to the earnest recommendation contained in Mr. Ramsdell's presidential address, and all the members of your committee felt it their duty to accept this appointment, because their experiences had convinced them of the urgent need of reform in this direction.

An efficient system of bookkeeping should provide for the keeping of complete records of all business transactions, whether involving or not the direct transfer of money.

The books so kept should be completely self-explanatory. Too often entries are so made as to be only understandable by those who made them. Memory or unrecorded information should have no part in such a system.

Finally, the test should be the capacity of the books as kept to show the final result of the business for any selected period. Especially should the system be designed and operated to provide against the improper application of profits and the payment of dividends not earned. But something more than final results should be obtainable from such a system. The operating accounts should be so sub-divided in accordance with the nature of the business as to furnish the ready means at all times for the exact analysis of operating expense and the locating of all uneconomical methods.

In a business such as ours, this means the keeping of the ordinary books of account and also of supplementary or statistical books. But such a system as your committee has been charged to report must go still farther, and be so comprehensive as to be capable of general adop

tion by gas companies; in other words, it must provide for the *uniform* analysis and comparison of accounts.

In connection with our Association and other conferences, and with the conduct of a united scheme of management, now such an important and growing feature of the gas business of this country, it is of prime importance that the accounts should be so kept that the costs of gas delivered to the consumer's burner should be so subdivided as to provide for this uniform analysis and comparison, step-by-step through the works, the streets and the office.

Not only would this be of great practical value in operating but it would also render it more difficult for irresponsible parties to find an apparent basis for claims impossible of verification as to the cost of gas.

Each member of your committee appreciates the magnitude of such an undertaking, for all having had experience in the management of united companies have found that, even where all the companies are subject to uniform instructions and control, the absolute uniformity of accounting is most difficult of attainment. This is here stated not to discourage the present attempt to provide for general uniformity, but to point out that there are necessarily difficulties hard to overcome by reason of the great variety of local conditions, as well as the *general difficulty of securing a uniform interpretation of all rules and instructions.*

As the natural basis for a system of operating accounts should be a division of the expenses through a sufficient number of accounts to facilitate an accurate analysis of the cost of manufacturing and distributing the gas and the other expenses incidental to the business, and as any system of uniform accounting must primarily depend upon the adoption of a uniform system of classification, your committee first took up this part of the work.

While considerable has been done, even this part of the work has not been finished, but the committee feels that it is proper at this time to report the results so far obtained, and suggests that if it meets the wishes of the Association the committee can be continued under conditions that will give it the advantages of the criticisms of the members of the Association before making its final recommendations.

Your committee, therefore, asks permission to submit the result of its work to date, which are shown by the classification schedule, instructions for use of same, instructions for journalizing, etc., herewith, with the further suggestion that between now and the 1st of January next your committee shall print its tentative recommendations, and that the same be sent out to all the members of the Association with a request for criticisms by mail to be received by the committee not later than the 1st of April next.

Your committee then expects to prepare for final submission to the Association, at its meeting in October, 1902, a classification schedule with accompanying instructions, instructions for journalizing, and the necessary forms for vouchers, time sheets, pay rolls, storeroom records and the like, necessary or desirable for the proper carrying out of the system. It is probable also that the committee would then be prepared to submit forms for itemized monthly and yearly statements of cost and profits.

If your committee, with the concurrence of the Association, so proceeds, it will do so with the understanding that it is to receive the active co-operation of the members of the Association along the lines above outlined.

While some members of the Association may feel that they are not qualified to completely criticize such a comprehensive scheme of accounting, your committee knows that there are many members of the Association well qualified to do so at every point, and that all the members are qualified to advise at certain points. Your committee desires to avail itself of the advantage of as many points of view as possible.

Your committee has not so far considered it advisable to confer with other bodies engaged on like work, for the reason that, until they had arrived amongst themselves at something more like a final conclusion, such outside conferences promised confusion rather than results.

Your committee recognizes that for lack of time it will now be difficult to give the Association a complete view of the work so far accomplished, but feels warranted in asking for sufficient time to give a general outline of the classification system so far agreed upon.

In preparing the classification schedule, the committee has deemed it wise to first consider the needs of the larger companies. The result will be known as the "Senior Classification Schedule;" later it is proposed to prepare a "Junior Classification Schedule," which will contain the general accounts, as in the senior scheme; but these general accounts will not be subdivided to the same degree.

While this will not provide for a complete comparison in detail between a company employing the senior schedule and one employing the junior schedule, a fair comparison can be had on all the general items of cost. This will be better understood when the senior classification schedule is studied.

It is here well to consider that the smaller companies will prefer to compare their costs with other smaller companies. If the senior classification schedule were pronounced by any one company too elaborate for its adoption, and an independent modification thereof were developed, it is needless to point out that all opportunity for comparison through a uniform system would be at once destroyed; whereas, by the system of modification we suggest, the same general classification will be available.

The classification schedule as herewith submitted is not intended to be complete. Gas and other sales accounts, sundry creditors, etc., as required for a complete statement of assets and liabilities, and especially of quick assets and floating debt, will be included later in connection with the revision before referred to.

It is proposed to adopt the following general divisions for the operating accounts:

Manufacturing. — To include the cost of gas to the outlet of the works.

Distribution. — To include the cost of gas from the outlet of the works to the outlet of consumers' meters.

Commercial Expense.—To include the cost of reading meters, collecting and accounting.

Expense.—To include general items not strictly applicable either to manufacturing or distribution.

New Business. — To cover advertising, canvassing and other expenses incidental to the extension of the business, either through sale of appliances or otherwise.

Taking these five accounts as the general heads, the classification schedule provides for sub-accounts, as shown below.

Under the heading of each sub-account is given: First, general directions as to the scope of the account; second, a list of the items chargeable to the account, in sufficient detail to enable any employe without special bookkeeping experience to determine, upon reference to the classification schedule, to what account any particular item is chargeable; and, third, where necessary, *special* directions for journalizing.

General Accounts.

Manufacturing.—Sub-accounts: Ammoniacal liquor expense; coke expense; tar expense; ammoniacal liquor residuals; coke residuals; tar residuals; boiler fuel; expense, works; fuel under retorts; gas coal; generator fuel; manufacturing labor; oil; purification supplies; purification labor; repairs, works; repairs, works, general; water tax; gas storage expense.

Distribution.—Distribution expense; distribution labor; repairs, mains; repairs, services; repairs, meters; street lamp operating.

Commercial Expense.—Expense, collection; expense, office; office salaries.

Expense.—Accidents and damages; expense, general; expense extraordinary; insurance; interest; litigation; association meetings; salaries, general.

New Business.—Advertising; appliance demonstrations; gas appliances; gas engine expense; gratuitous work; house fitting expense; expense, soliciting.

Further, it is proposed to employ the following:

Stock Accounts.—Ammoniacal liquor; coke; tar; storeroom.

It is proposed to open each month accounts for: Expense, stable; expense, storeroom; which accounts will be closed out at the end of each month into the various accounts for which work was performed, each account to bear its percentage of the total expense during the month. It is proposed to include the following accounts under the general heading

Miscellaneous.—Taxes; house and land rentals; interest on bonds; interest on borrowed capital.

In addition to these operating accounts it is proposed to adopt the following betterment accounts:

Betterments.—Extension of street mains; extension and improvement; street mains, inch extension; new meters; new services; street lamp extension; real estate; street main replacement.

For convenient reference the accounts will be numbered either in one series or as many series as there are general accounts. It is then proposed to further explain the system and eliminate ambiguity as far as possible by general instructions and instructions for monthly and closing entries.

Recognizing the difficulty of avoiding all ambiguity, your committee in all of its work, and especially in the preparation of its remarks and

guiding notes, aims to make its recommendations self-explanatory, even though in so doing it may be criticized for considering the subject from too elementary a standpoint.

It will be particularly noted that betterment charges (especially in the case of main laying) are provided for by special authorization accounts. This perhaps suggests only the requirements of a united system of management. But your committee holds that, even where an authorization does not first have to be obtained from an outside managing body, there should still be the record of an authorization of each extension of plant.

Even if the executive officer is given the authority to pass upon such work without submission to superior authority, for his guidance a careful estimate of cost and probable income return should be prepared; and when so prepared it must be to the advantage of the management to record the authorization in due form for future reference. Even in such a case it must be of distinct advantage to have a ready means of checking up the estimate with the final cost.

Furthermore, in the case of main laying, before passing the individual or authorization extension accounts into the general extension account, it is designed to pass them through accounts designed to show separately the cost of all the pipe laid during the year, grouped according to size. It must be seen that this will be of value to the single company as well as to the companies of a united system. Such a system must provide for increased accuracy in the preparation of estimates and for comparisons in construction cost.

If it is considered undesirable to cover all these subdivisions of betterment accounts in the general ledger, a supplementary authorization ledger might be employed, the general ledger then to only cover the final betterment accounts. It will also be noted that the system herein recommended depends upon a comprehensive and efficient system of storeroom records. As already noted, it is the purpose of the committee to include in its final report a recommendation in this connection. The committee recognizes that great care must be here exercised to secure a practical system which will be efficient but not cumbersome.

To facilitate the present consideration of this partial report, a limited number of selected sample sheets from the classification schedule have been prepared and are available for reference by the members present.

ALEX. C. HUMPHREYS,
LOUIS LILLIE,
A. P. LATHROP,
} Committee.

Discussion.

Mr. Shelton was of the opinion that, in the very thorough report presented by this committee, a long step had been taken towards that most desirable goal, a uniform system of gas accounts—which, if generally adopted, would be especially valuable for purposes of comparison. He wished to emphasize the importance of the suggested boiling down of the proposed system of accounts to provide for the wants of the smaller companies. This should be done by the committee rather than by individual companies, because in that way only could uniformity be secured. The plan should be made so clear, condensed and simple that it would commend itself to the smaller companies, instead of exciting their antagonism. His experience was that such companies were disposed to avoid as much bookkeeping as possible, and therefore the system of accounts proposed for them should be made so complete, and at the same time so simple and clear, that none of the smaller companies could fail to see their simplicity, desirability and practicability. He moved that the report be received, its recommendations adopted and authorized by the Association, and the committee continued for another year.

Mr. Nettleton would be glad to see such a complete method of uniform accounts generally adopted, and thought the report of the committee should not be passed by with so little praise. Those familiar with the career of Mr. Humphreys knew that he brought to this work a tremendous amount of experience, as compared with that of the ordinary gas man, the benefit of which he had freely given to this and other Associations. The Association was under great obligations to him and also to the other members of the committee for the work they had done and for the liberal way in which they had drawn upon their experience for the benefit of others in this matter. The keeping of a "Store Account," an important item of the proposed system, had always seemed to him to involve a large amount of work and expense, but after an experience of several months with its use, to which he had consented against his prejudices and almost against his judgment, he could say that neither the work nor the expense involved was as great as he had anticipated, while the results obtained were extremely satisfactory.

Mr. Witherby inquired whether the Board of Gas and Electric Light Commissioners of Massachusetts had been consulted with respect to this proposed system of uniform accounts. The laws of that State were very rigid with reference to accounts. Had the Commission considered the subject of changing from their present plan to the standard accounts proposed by this committee?

In reply, Mr. Humphreys stated that the committee had felt it to be its duty to report to the Association what, in its opinion, was a complete and proper system of accounts. The committee had to either report the Massachusetts rules back to the Association as its recommendation, or report without regard to any such restriction. He believed that the members of the Massachusetts Commission would probably credit the committee with knowing more in detail about gas accounts than did that Commission, because the members of the committee had passed their lives in the business as their calling; and after careful study it did not seem to the committee that it could accept the Massachusetts rules. It was unnecessary at this time to point out the reasons for reaching this conclusion. He did not know whether it was possible to have any change authorized in Massachusetts, but it seemed to him that if this proposed plan were adopted by the Association there would then be a better chance of getting a uniform system of accounts in Massachusetts. In any event the Massachusetts reports could be readily made up from the system now proposed. Mr. Humphreys protested against accepting all the credit for the work thus far done by the committee. He had had the active co-operation of Mr. Lillie, who, as Treasurer of the United Gas Improvement Company, had necessarily had a very wide experience, and had been specially trained in this particular business, and of Mr. Lathrop, who had also had unusually wide experience and was a man of most excellent judgment in these matters. The report, therefore, was not the work of the chairman alone, as was often the case, but was the work of the committee as a whole, and he had never been on a committee where this was more the case.

Mr. Egner stated that some years ago he had endeavored to secure the adoption of a somewhat similar system of accounts by the Western Gas Association, but one member had then stated that he did not want to have the accounts of his Company so simplified that any one could go over them and find out all about them. He had had some experience with such accounts, and knew that the adoption of the proposed plan would be easier than it now seemed. It was a step in the right direction; and he thought the hearty thanks of the Association should go to the committee for its services.

The motion of Mr. Shelton was adopted.

FIRST DAY, AFTERNOON SESSION.

REPORT OF COMMITTEE ON RESEARCH.

The afternoon proceedings were opened by a verbal report from Mr. A. S. Miller, chairman of the Committee on Research, who stated that the individual members of the committee had been so busy they had been unable to devote to research work the necessary time. Still, the committee had tried to accomplish something. The special work of the committee during the past year had been on standards for flanges, street main specials, and street main hubs. A number of experiments had been undertaken, and it was expected that the results of these would be given to this meeting, but it had been thought better to postpone a report until those experiments were completed. Mr. Walton Forstall would later on present a short topic in which he compares the standards which he is using with the Association's standards. This Association now has a set of standards which is either right or wrong. If right, they should be used; if wrong, it was the duty of members of the Association to advise the committee wherein they were wrong. In this way only could individual members absolve themselves from responsibility.

The report was accepted, and the committee continued.

APPOINTMENT OF COMMITTEE ON NEXT PLACE OF MEETING.

The President appointed as the committee on the place of next meeting, Messrs. E. H. Jenkins, Thomas Littlehales and A. S. Miller.

Mr. Frank D. Moses, of Trenton, N. J., then read his paper entitled:

WHAT IS THE BUSINESS OF A GAS COMPANY?

[For the text of Mr. Moses' paper, see JOURNAL, October 21, p. 647.]

Discussion.

Mr. Clabaugh regretted that Mr. Moses made such slight reference to illuminating gas, for in the effort to increase the use of gas for fuel and heating purposes they should not lose sight of the fact that primarily they were manufacturers of gas as an illuminant. He referred to the importance of obtaining a good by-pass which could be used with incandescent gas lamps. The by-pass now in use with the Welsbach light was a poor affair, hard to adjust, and easy to get out of order. Something better should be devised, and the by-pass should be used in every connection. Its use meant an expense of only 4 or 5 cents a month, and was a good investment. The use of gas should be urged in

every possible way. Where arc lamps are in use endeavor to displace them with incandescent gas lamps. Wherever practicable, heating stoves should be introduced for the consumption of gas. The gas range could be economically used in the kitchen for cooking all the year round; but some consumers did not care to install a gas water heater when it was necessary to have a coal range to heat the water economically in the winter. However, a connection could be made with the furnace in such a way as to furnish all the hot water required in winter, and without additional cost. This could be done by taking the waste heat from the center of the furnace. The radiation from the boiler would heat a small kitchen. If more heat were required a pipe could be run from the furnace through a hot water radiator. In that way not only heat but also a supply of hot water could be had. He believed that about 90 per cent. of the gas ranges put out by his company were in use in winter as well as in summer. A charge of $10 was made for this furnace connection. His company endeavored to induce property owners to put in these connections for tenants; if they would not do it an effort was made to persuade the tenant to put it in by stating to him that it would pay for itself in short time by the saving in cost of coal by the use of gas fuel.

Mr. Spragle had endeavored to use the connection mentioned by Mr. Clabaugh, but had found it difficult to get into some furnaces, particularly the steam furnaces having a double wall around the fire-pot and a water space between the inner and outer linings. Heaters were made which were not only economical in the use of gas, but were of pleasing design and ornamental in appearance, and these were frequently bought for the twofold purpose of utility and ornamentation. Within the last two years his company had installed over 100 of such stoves, and the first 6 months showed an increase of gas consumed of over a quarter million cubic feet. It often happened that efficiency was not the only consideration with the purchaser; the ornamental design, when called to his attention, often proved to be something he had been unconsciously looking for.

Mr. Egner agreed with the writer in the statement that many owners of gas properties refused to invest the funds required for modern betterments and extensions. There often seemed to be a great deal of injudicious economy with those in control of gas companies. For instance, they would not put in services free, nor would they set a meter free. He was satisfied that often it was more economical to put in services free and set the meters free than it was to lay new mains. For example: He had estimated that a mile of 6-inch main would cost about $3,400; for that expenditure 166 services and consumers' meters could be put in, at a cost of about $20 each. It had been stated that the average sale of gas per meter was 32,684 feet. Multiplying the meters that could be set for the cost of, and instead of that mile of main, by the average sale of gas, would convince anyone that it would often be more economical to put in free services and place meters free than to lay the additional mains.

Mr. W. S. Allen thought the first step necessary in introducing gas stoves for winter use was to persuade builders to provide some means for heating the kitchens. If that were done a large increase in gas consumption by ranges could be secured. We might profit by following the example of the European companies in respect to forcing the increased use of gas among the poorer classes. The South Metropolitan Company, London, England, puts in a gas range, a certain amount of gas pipe, with one burner in the kitchen, and a penny-in-the-slot meter. The meter is adjusted to such a price as will give a return equal to a fair rate of interest on the amount of money invested, plus the depreciation of the apparatus. In that way it had increased in enormous ratio the number of meters in use in South London. Nearly one-half the total number of meters out were those of the penny-in-the-slot type, and used under the conditions stated. It had not seemed of any use to undertake to force the consumption of gas in the poorest districts of London; yet it had been successfully done by that Company. In Paris, when the rental of an apartment is less than $100 per year, the Gas Company furnishes the connections free; if an apartment rented for a greater sum, the consumer was required to pay the cost of setting the meter and of putting in the appliances. The result was that in Paris the consumption of gas had been very largely increased among a class of people who, under ordinary circumstances, would have used no gas at all. The result in South London had been an average consumption per meter of almost 900 feet per month; and if the price of gas is fixed at such a rate as to pay the interest on the investment and cover the depreciation of the appliances it would certainly give a good return to any company.

Mr. Walton Forstall said that in some American cities a gas company would not be permitted to make an extra charge for gas supplied through a prepayment meter, although Parliament had recognized such an extra charge as just in London. If we expected to teach our poor people to use the prepayment meter it would be well to use a meter which would take a smaller coin than 25 cents at a time.

Mr. W. S. Allen believed the point suggested by the last speaker was a most important one, and that such a modification of existing statutes should be secured as would permit gas companies to charge an increased rate for gas furnished through prepayment meters. He thought there would be little difficulty in convincing the law makers that such an extra charge for the additional facilities furnished was legitimate and proper. And the attention of meter makers should be called to the importance of introducing a meter which would take a dime, or even nickel, in prepayment for gas.

Mr. Rice suggested that one branch of the gas fuel business which had not received the attention it deserved was the use of gas for the heating of churches. In Norfolk, Va., which had comparatively a mild climate, a considerable business had been done in church heating. Gas radiators had been introduced into every new church, and in almost every church making changes in its heating outfit. It had been found in that city that the churches could be heated more economically with gas than by means of coal. In Portsmouth, Va., they began to push fuel gas somewhat earlier than did the Norfolk Gas Company, and every church in that town was now heated by gas. An advantage in pushing the Sunday business was that the Sunday sendout came nearer the week-day sendout. The church business in Norfolk had sent the Sunday output ahead by leaps and bounds.

Mr. Robinson said that there was no reason why a wrought iron pipe loop, connected with the kitchen tank, could not be cast in an ordinary steam radiator loop in such a way as to give an abundant supply of hot water with no expense for fuel. The manufacturers of steam radiators would probably be glad to manufacture a radiator loop to be put on any radiator, if there was a demand for it.

Mr. Searle said that while all gas men were in the business for profit, and while there was no one would not get additional business if he could, he believed there was no one who could not get more business if he tried for it. He had been asked of what use it was to put out canvassers in trying to get new business. Of course there was no use in doing it unless one had the right kind of canvassers, and if a canvasser were trying to push the Welsbach lamp against the incandescent electric light there would be little use in his walking into a house and simply saying, "Good morning, I have a Welsbach lamp. It costs $1. Do you want it? Good morning." He must have some tangible reason to urge for introducing the Welsbach. Mr. Moses had referred to the gas office. The average gas office has a little hole in the wall where the bills are paid. All fences and bars between office employees and the public should be removed. If a woman comes into the office to ask for an extension of time on her gas bill until her husband is paid, so that she may get a gas range in the meantime, she does not want to have to talk to the clerk through a little bit of a hole. She would prefer to lean over the counter and talk confidentially, explain the difficulty, and ask for an extension of the gas bill for a few days in order that she may pay the first installment for a gas range. It often happens that the treatment accorded by officers and employees to customers not only keeps away business but makes enemies for the company. Mr. Searle said that he was more and more of the opinion that the canvasser was an important part of the gas business; and that if a company had canvassers of sufficiently high caliber to tactfully approach prospective consumers they would be sure of success.

Mr. F. R. Persons stated that his company employed one class of canvassers, who were called the "back-door" men, whose business it was to go to the kitchen and see the women at work; another, and a better educated class, would go to the front door and see the lady of the house. The canvassers were required in all cases to tell the truth, and were never permitted to make any misstatements. If the company guaranteed a range or a light it was bound to stand by that guarantee; and if a canvasser made a misstatement he was required to make it good.

Mr. Ganser believed a canvasser could be very useful to a company in getting consumers if he had the tact to go about it in the right way. If he went to a house, rang the bell, got the woman to the door, made a few casual remarks, being careful at first to give no hint of his business, and after having made a favorable impression let her know that he was selling gas ranges, he would be likely to succeed. But after placing a range he must not consider the matter ended. He must see that the user knew how to manage the range. He must go into the kitchen and see how the piping is done. He will very likely find that at the start the cook has turned on both burners, or allows them to burn too long, so as to do the baking too quick, with the result of not

getting as good bread as she would with a smaller fire. Or he may go into a barber shop and learn that the barber has been burning coal oil for the last 10 years at a cost of 65 cents a month. There might seem to be little chance of selling gas in that shop; but if the change is made as an experiment customers notice it and naturally infer that the man's business is growing. The shop has become more attractive and the business increases. The gas bill is a great deal larger than the oil bill used to be; but he does not complain for the reason that he is getting more trade. So that in getting in a gas light, or in introducing an improved burner, one is not only doing himself a favor but he is also doing a favor to the customer. But do not let the canvasser do all the hustling; go out and hustle for yourself.

Mr. Searle added that the canvasser when bidding on a gas engine should be able to calculate the power required. If he is a man of tact he will not ask the consumer that question, but will ascertain it from his own observation. He can either write to the manufacturer of the machinery for which the motor is to be used and get the information, or he can make the calculation from the belting and pulleys, or ascertain the displacement of pump plungers and the pressure required. Having accurately ascertained the horse power required he will be able to bid intelligently. Having that knowledge he will be able to bid successfully where another man who does not really know what he is talking about would fail.

Mr. A. S. Miller desired to register a protest against the statement made by Mr. Moses that "fuel gas is recognized as a redeemer of the gas industry." The larger part of the gas business was still in lighting, and he believed that the larger part would continue to be the lighting business if gas men put into the lighting end anything like as much energy and time as they put into the fuel end of the trading. Members talked much in the meetings of fuel gas; they went home and worked for fuel gas; they went around their towns and saw large and attractive places lighted by electricity, the lighting of which the gas company could get if it worked for it; they spent money in minor directions, which if put into intelligent work on large consumers, users of electric light, would induce them to become gas consumers. The papers which have been read before the electric light associations of the country show that incandescent gas lighting has made very serious inroads into incandescent electric lighting; and he believed those inroads would be very much more serious than they were if the gas lighting business were pushed as it should be.

Mr. Clabaugh believed that if a company had 5,000 consumers, that ought to mean 5,000 canvassers, for correct and courteous treatment would make of every consumer a canvasser. It was an erroneous impression that the loss of one consumer was a trivial matter, provided a new consumer was got in his place. It was hard work to get back a customer lost through mismanagement or dissatisfaction from any cause; whereas, every satisfied consumer was a most valuable canvasser, for he would influence others to become customers.

Mr. Witherby referred to the case of a company whose electric light plant was in an overloaded state, making it probable that in the approaching holiday lighting the company would be unable to satisfy its customers. In less than 60 days the company had put in 80 gas arc lamps, pursuing the same policy with respect to them as in the electrical department. They removed the electric arc lights and put in the gas arc lamps and maintained them, excepting the mantles. If a mantle broke 50 cents was charged for putting in a new one. The company had thereby been relieved of the necessity of putting in a $40,000 plant the last summer, and the result had been a very satisfactory increase in gas illumination.

Mr. J. T. Lynn wanted to protest against the remark of Mr. Miller with regard to fuel gas not being the salvation of gas companies. Outside of the large cities he believed there were few gas companies whose fuel account did not run larger than the illuminating account. Credit was due those who were pushing the illuminating gas business, but he did not want to see them relax their efforts in the direction of increasing the sales of fuel gas. The gas appliance men deserved a great deal of credit from gas men for their energy and efforts in putting gas appliances on the market and thereby increasing the consumption of gas.

Mr. Egner stated that he was the predecessor of Mr. Rice in Norfolk, and thought that perhaps his experience in inducing the churches of that town to use gas for heating purposes might be interesting to the members. The company had been anxious to introduce gas in the churches for that purpose, and had taken some steps in that direction, but had found that the church people wanted the radiators for nothing, if they could possibly get them in that way. The company was willing to put them in without any profit to itself, but was not willing to give them away. The churches in Norfolk were very anxious to get the radiators for the reason that they had been introduced in Portsmouth, and had proven very satisfactory there. Accordingly he bought 3 or 4 radiators and presented them to one of the churches. In doing this he had not acted the part of the philanthropist but only from business motives; he was anxious a start should be made by the churches in the use of gas for heating purposes, and had bought and given them those radiators. The result had been as stated by Mr. Rice.

Mr. Rice called attention to the subject of piping old houses on the line of present mains, and inducing the occupants to use gas. He believed it to be an important matter, and asked if anyone had had experience in that direction. Any gas company would find a good percentage of houses on its lines of mains which were not burning illuminating gas and which were not piped. If the occupant were asked to use gas he would likely reply that the house was not piped, and it would cost too much to pipe it; or else he might say he did not want the house torn to pieces by the piping. This was a business which was well worth looking after and obtaining. The people in unpiped houses were not apt to use electricity, but they would use gas in preference to kerosene if they could be shown that they could avail themselves of it at a small cost and little trouble.

Mr. Clabaugh stated that his company had piped a large number of houses, and sold gas to a number of new consumers as the result without coming in conflict with the plumbers in any way. The work had been done at a small profit. It was good policy to do many things for nothing, but not to do everything for nothing; for if this were done it would not be long before the legislature would be asking, "If you can give so much away, why do you not reduce the price of gas for the benefit of the many, instead of benefitting only the few to whom you are giving these things?"

Mr. Harper stated that the company which he represented had just completed a canvass of the entire city, without going beyond the lines of existing mains, and now had on cards and in convenient form information as to every house on the lines of its mains, whether piped or otherwise; if piped, whether gas was used there; if gas was used, for what purpose, whether for light or fuel; what fuel appliances were used; whether the ranges were satisfactory; the number of rooms in the house, and whether the occupant owned or rented. When a canvasser went to any house to solicit the occupant to use gas, he knew in advance just what the requirements were and what would be his chance of success. If the company were in position to take full advantage of this information it could increase its business 25 per cent.

Mr. Shelton said that he knew of one company which, by an expenditure of 5 per cent. of its capital account, had increased its business nearly 100 per cent. within less than 6 months.

Mr. Moses, in closing the discussion, said that his company was trying to sell small cooking stoves (costing $3 or $4) for use in hea ing kitchens in the winter. A great deal of his output was used by working people who had to use gas in order to get breakfast in a hurry. He usually ran 100 feet of main for each new consumer, and the average of gas bills had increased from $1.70 to $2.26 per month; 7 or 8 solicitors were employed all the time. A man was not sent over the same territory twice unless there was some prospect of selling. The best solicitor was kept until the last—and the last was a lady. A professional baker was employed, who went around and taught the families how to make bread and biscuit by the gas stove, and if permitted he would make up a batch of bread while there.

Report of Committee on Advertising.

The President said that as Mr. F. D. Moses, who represented the Association on the Committee on National Advertising, was obliged to leave the city before the close of the convention, he would now call upon him to read the report of that committee. A committee had been appointed at the last meeting of the Association to make a report at this time upon some scheme of co-operative or national advertising. The Western and the Ohio Associations had each appointed a similar committee, and those committees had already presented their reports.

Mr. Moses then read the following report:

To the President of the American Gas Light Association: In obedience to the spirit of your commission, your committee having looked into the matter of national gas advertising, has to report to you as follows:

In order to carry out the matter of national advertising of gas, a fund would have to be created. This money could be obtained by small assessments on the gas companies, according to the benefits they would receive. According to figures given in "Brown's Directory of American Gas Companies" there are 32,000,000 people in this country either supplied by gas, or who could be reached by gas companies. If every company would be willing to subscribe $1.50 per year

for every 1,000 of the population it could supply, it would give $48,000 for general advertising; supposing that only companies representing ½ of this population should subscribe to the fund, $16,000 would be subscribed. This money would be used for magazine and bill board advertisements, and for the maintainance of a bureau for distribution of advertising matter. Monthly magazine advertisements have been used to much advantage to popularize different commodities, and 10 of the leading publishers in the country have been asked to furnish figures for advertising in their periodicals. Their figures show that the cost

SCHEDULE OF ADVERTISING RATES IN MONTHLY MAGAZINES. ONE INSERTION.

	Per Line.	Per Inch.	Per Page.
Harpers' Magazine.....	$1.75	....	$250.00
Harpers' Bazaar.....	1.00	....	200.00
Century Magazine.....	1.75	$21.00	250.00
Household Magazine.....	.65	9.00	520.00
Ladies' World.....	2.00	28.00	1,480.00
Cosmopolitan.....	2.00	28.00	448.00
Ladies' Home Journal...	....	84.00	4,000.00
Munsey's Magazine	3.00	....	500.00
Scribners'	1.50	....	250.00
Metropolitan.....	....	7.00	112.00

per page per month is from $250 to $4,000, which price is governed mostly by the circulation. For about $2,000 per month we could have a quarter page advertisement in all the leading magazines; and 6 months' advertising, which we would probably use per year, would cost $12,000. With a fair proportion of the companies subscribing we could place the word "Gas" before the public as often as they now see the names of different kinds of soap, pills and biscuits, and the cost to gas companies would hardly be noticeable. Take for instance a gas company in a town of 40,000 inhabitants. Their assessment would be only $60 per year, or $5 per month, and even the smallest possible results would fully reimburse them for their subscription.

Your committee would also suggest that a bureau be established that would be a "clearing-house" of gas advertising matter, where all companies could send any advertising matters or designs that would be of interest to the others. This matter could be put in pamphlet form, together with ideas by gas managers, and any other matters of interest to the subject. These pamphlets would be furnished free to subscribers, and the companies not subscribing could get them at a price determined by the cost of compiling them.

Your committee requests the right to work with the committees of the other Gas Associations, and be also empowered to solicit subscriptions to the fund, and commence work as soon as possible. The matter has been under discussion for several years, and as we have only met once a year progress has been slow, but if the start is made now the results of one year's work will be so surprising that all gas companies in the country will gladly contribute to the fund.

Discussion.

Mr. Persons stated that he had received a letter from Mr. H. L. Doherty, a member of the committee from the Ohio Association, who could not be present at this meeting, which he would read. Mr. Doherty wrote:

"My faith in the results of national advertising has never wavered for a moment. If I had the time I would be glad to show my confidence in our ability to raise the fund required; but conditions have so changed with me that I have become incompetent to do any of the work. I would resign from the committee did I not believe that I would be free to take up the work again in the near future."

Capt. White moved that the report be received, and that the request of the committee, that it be empowered to associate itself with the committees of other Associations and go forward with the work, be granted, and that the consent and indorsement of the Association be given. [Seconded by Mr. Littlehales.]

Mr. Shelton said that before the question was put he desired to ask for further information. Apparently the committee was to be empowered to at once commence the work by asking subscriptions from the various gas companies, although no general or joint action had been determined upon, nor was it said who was to be responsible for determining just what advertising would be done. The report centered upon magazine advertising, from which non-subscribers would receive equal benefit. Were other lines of advertising contemplated? Would the committee advertise by bill boards, posters and other local advertising, which would be done only in the cities of the companies subscribing to the fund? Before acting as an Association on this matter there should be had a clearer understanding of the intentions of the committee in order that the Association might intelligently determine for itself the advisability of joining in the work. He did not think the Association should as yet go on record as advocating the plan. The better plan would be for the committee simply to report progress, so that the Council might have an opportunity to determine whether or not it would indorse the project.

Mr. Persons explained that the purpose of the committee was, at its own expense, to send to every gas company in the United States by November 1st a statement of the reasons why they should subscribe to this fund. Then, on January 1st the committee would send requests for subscriptions to the fund to every gas company; and if a satisfactory response followed the committee would begin advertising by the 1st of March. The purpose of the committee was to provide sensible and seasonable matter to every gas company subscribing to the fund; and if a gas company which had subscribed wanted a cut or other advertising matter for a local paper it would be supplied.

Mr. Moses said it had been difficult to get the committees together, or to get their views expressed in one general report. The matter of billboard advertising had been discussed; and such advertisements would be furnished in large quantities, and at cost, to subscribers to the fund. Non-subscribers would be required to pay an advanced price for advertisements, and this would induce them to become subscribers. The committee did not wish to do anything without the approval of the Council; and he suggested that each committee report to the Council of its respective Association and receive its orders before going any further in the matter.

Capt. White's motion was adopted.

[To be Continued.]

Retort Ovens as Producers of Illuminating Gas.

[A paper read by MR. T. LITTLEHALES, of Syracuse, N.Y., at the 29th Annual Meeting of the American Gas Light Association.]

The whirligig of time brings about strange changes, and often illustrates the saying that the new is only the old made over ugain. Discoveries supposed to be new are often found to be only a fresh bringing to light of facts known long ago. Great latent possibilities and powers often exist unobserved in connection with daily operations, until some radical innovator, who, not content to take things for granted, or as he finds them, turns them upside down, looks under, over and through them, turns them end for end, and possibly turns them inside out and shows us unexpected things.

Ovens for gas making had been used, and had been superseded by the retort long before many of the members of the American Gas Light Association had ever seen the inside of a gas works. They were largely used in Scotland at one time, and I personally can well remember as a youth, in my student days, hearing ovens defended by one who had used them 30 years prior to that time; their chief merit as compared with retorts being their much greater durability, their chief defect, that the fuel account to heat them was very high. And the differences between the ovens of those days and the present are no greater than between the retort systems of the early period of gas making and those of the present day.

Sometimes things are ahead of their time, or conditions are not favorable to their development. As a notable instance of this latter feature in connection with the gas industry, the following is a striking example:

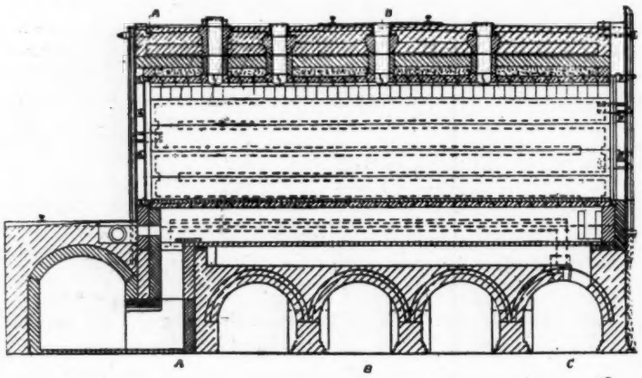
About 50 years ago two of the eminent London gas engineers of that time, Messrs. S. and T. N. Kirkham, brought forward the idea of making water gas by the decomposition of steam in contact with incandescent carbon, and took out patents for the same in 1852. But neither London nor Paris could be induced to take it in hand; consequently the idea laid practically dormant for upwards of 25 years, when Mr. T. S. C. Lowe, in this country, put the matter on a new basis, and mineral oil, having been discovered in the meantime, and Mr. Lowe's efforts being supplemented by the great skill, energy and perseverance of a few others, water gas making became a commercial success. And to-day, London, British, and in fact European gas interests generally, have been and are greatly enhanced and benefited by water gas methods, developed, improved and firmly established in the United States and taken back to Britain again a solid success.

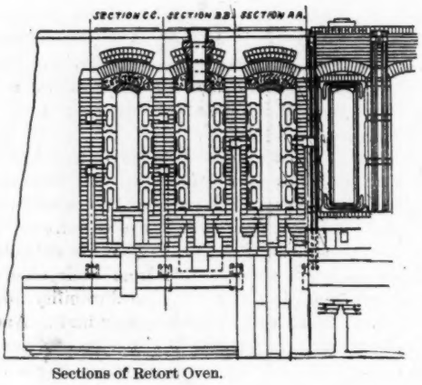
I think it justly due to a distinguished member of this Association, and one of its past presidents, to add, in this connection, that probably

no other man has done as much to place water gas in the position it occupies to-day in the gas world as our esteemed colleague, Mr. Alexander C. Humphreys.

Then, again, vested interests, with the inevitable conservatism surrounding them, often stand in the way of new methods. But these, however strong, cannot successfully resist the march of progress, and sooner or later they join in the procession and move onward.

From the earliest history of gas manufacture, every progressive gas man has sought to cheapen production by improving the methods, by the introduction of labor saving contrivances, especially in the handling of coal by machinery, etc., and the gas interests are greatly indebted to those who have been the pioneers in all these efforts for improvements. Changes amounting almost to revolutions have taken place in the various phases of the gas industry within the memory of the older members of the American Gas Light Association, and we must not for a moment suppose finality has been reached, but must expect many developments to be revealed by the future, probably to the extent of more revolutions, of which coke ovens, as they have hitherto been called (because the production of coke therein has been the primary consideration), will be one very important and prominent





Sections of Retort Oven.

feature; but the time has now arrived when they should no longer be called coke ovens, but gas ovens, or perhaps more correctly retort ovens, because they are, in all essential respects, retorts on a large scale, practically differing only from the ordinary retorts in their greater capacity, and the necessary changes in form of construction to meet the requirements of the larger capacity, and the method of charging and discharging them.

Coke ovens are as old if not older than gas retorts, and upwards of half a century ago the attempt was made to recover the gas and other products therefrom, and in like manner, as I have shown, in reference to water gas development, the by-product recovery has, especially in the United States, laid almost dormant until the last few years, notwithstanding that the increase in coke production has steadily advanced and at enormous bounds.

Mr. John Fulton, member of the American Institute of Mining Engineers, in his excellent, able and exhaustive work on "The Manufacture of Coke and the Saving of By-Products," says:

"The efforts for supplementing the profits of coke making by saving the by-products of tar and ammonia from the gases discharged from the coke ovens, occupied the early attention of coke manufacturers. It is recorded that the first coke ovens, producing tar and ammonia as by-products, were constructed at Sulzbach, near Saarbrucken, in 1766.

(Ten years prior to Murdoch's experiments, 30 years before Watt's Soho foundry was lighted with gas, and 50 years before the first gas company was incorporated in London.)

"Very slow progress was made in the saving of by-products; their practical manufacture and sale in market were not assured until about the year 1883. In 1856, Knab, in France, built a group of coke ovens, in which a double purpose is evident – the saving of the by-products, tar and ammonia. The gases, freed from tar and ammonia, were returned to the ovens and burned in the flues to reinforce the heat for coking. These ovens are described as having narrow vertical chambers, 23 feet long, 6 feet 3 inches high, and 3 feet 3½ inches wide (which is clearly the parent of modern by-product or retort ovens). The principal difficulty in extending the use of these ovens, and which has only recently been corrected, consisted in the neglect of proportioning the several parts of the oven to the requirements of the quality of the coals to be coked. With the advent of correct dimensions in the retort ovens, to meet the wants of the various qualities of coal, their increased use in the manufacture of coke and saving of by-products has been largely extended.

"In 1862 Simon & Carvés, of France, made very valuable improvements in the original plan of the Knab oven.

"The construction of this Knab-Carvés oven with important improvements in 1873, to assure the better distribution of heat, afforded a model for subsequent coke ovens.

"Hüessner built 100 ovens in 1881, establishing the by-product industry on a sound basis in Germany.

"The first ovens on the principle of what is now known as the Semet-Solvay retort ovens were constructed by M. Semet at Mons, in Belgium, in 1882, and the system has gradually since that time been growing until at the present time there are many hundreds of ovens in operation."

The capabilities and possibilities of such gas-generating plant as retort ovens are of such character as to make it absolutely certain that they have "come to stay," because they contain features of advantage distinctly in advance of existing methods.

The prediction was made many years ago that the time would come (in consequence of the variety and value of the products obtained from the distillation of coal) that if gas were entirely superseded for lighting, coal would have to be distilled, especially for tar and the many things derived therefrom, even if the gas were useless, and comparatively few persons are aware of the large number and great variety and value of products that chemical science has succeeded in producing from tar and liquors from coal gas manufacture. Probably no one thing or substance known of to-day has added so largely to the list of things of value in the arts, in medicine and in the sciences and manufactures generally as coal tar has done. So that far-fetched and extreme as most of the gas men thought that prediction to be, it is to-day an accomplished fact. It is no longer a theory, it is an actual condition, and one to be seriously faced and dealt with. There are places to-day where the gas is being absolutely wasted from these retort ovens, and yet the products, coke, tar and ammonia, make the business a commercial success, so that when gas can be made for nothing per 1,000 feet, it is quite evident it can be sold from the ovens considerably cheaper than most gas companies can make it.

And as Mr. Shelton has given such an excellent practical demonstration and proof of the fact that ordinary illuminating gas can be economically and satisfactorily carried under high pressures for long distances, these facts coupled together will in the future exercise considerable influence on the gas business.

Disturbing as it may be to some, and hurtful as it surely will be to others, it will, like all true progress, eventually redound to the benefit of humanity.

One of the great scientists of the past, Dr. Siemens, predicted that the time would come when in thickly populated localities solid fuel would be a thing of the past, and year by year a little further advance is being made toward that goal of comfort and happiness to mankind, and the by-product or retort ovens will make a bigger stride in that direction than most people are at present aware.

One great advantage of the by-product or retort oven process over the ordinary retort process is in the character of the coke produced.

The whole mass, as it comes from the retort oven, is a first-class furnace coke (provided the coal used is capable of making a first-class furnace coke in a beehive oven). If proper precautions are taken, it can be made equal to the best 72-hour foundry beehive coke, suited to the highest requirements.

So that to-day the factors of the problem of gas manufacture are being

slowly, but none the less surely, changed, and in certain localities where there is a demand for metallurgical or blast furnace, or foundry coke, instead of the gas being the prime consideration, it is a minor one, and the gas often has to be dealt with, as most of the older gas men have in past times had to do with their tar, burn it. Of course, it seems rather strange to a gas man to have to burn millions of cubic feet per day of good gas under steam boilers and other apparatus simply to use it up, gas that can with very little trouble and expense (a few cents per 1000 feet only) be made as available and as suitable for public use as that made from retorts and sent out from the gas works, and it seems hard to make the average gas man realize this. And a market must as naturally be sought for the by-product gas as the gas man does for his by-products, coke, tar and ammonia.

There are very many localities where foundries and other business use up a great deal more coke than the gas company of its locality produces, probably ten times as much, even if the gas retort coke were suitable, which it is not, for blast furnace or foundry purposes, being too soft and porous, while the retort oven coke can profitably supply the demand for every kind of coke required, from the hardest foundry coke to that suitable for domestic purposes.

The retort oven, if properly constructed and managed, can be and is being profitably operated from the standpoint of coke and by-products alone, even if there were no means of disposal of the gas.

Of the gigantic character and extent of the coke industry few people have any adequate conception.

The following figures will, perhaps, aid in a fuller and clearer understanding of the subject. My calculations are based upon a U. S. Government report for the year ending 31st of December, 1899, by Mr. Edward W. Parker, Statistician U. S. Geological Survey, on "The Manufacture of Coke." This report was issued from the Government Printing Office in Washington, 1901. Mr. Parker's figures are in the following table:

COKE OVENS IN THE UNITED STATES IN 1899, COAL USED THEREIN AND COKE PRODUCED THEREFROM.—*From Report by Mr. Edward W. Parker, Statistician, U. S. Geological Survey, on "The Manufacture of Coke," Washington: Government Printing Office*, 1901.

In 1899, Order of rank in Coke Production.	Coal used. Short Tons.	Coke produced. Short Tons.	No. of Ovens on Dec. 31, 1899.	No. Building in 1899
Pennsylvania	19,930,419	13,577,870	27,591	1,666
West Virginia	3,802,825	2,278,577	8,846	619
Alabama	3,028,472	1,787,809	5,599	850
Virginia	994,635	618,707	1,588	429
Colorado	898,207	530,424	1,243	50
Tennessee		435,308	2,040	62
Massachusetts	Included in with Penna.	.....	400	....
Ohio	142,678	83,878	385	....
Kentucky	151,503	81,095	300	130
Montana	110,274	56,376	303	....
Georgia	78,098	50,907	350	100
New Mexico	68,594	44,134	190	....
Wisconsin	54,950	33,437	120	....
Washington	50,813	30,372	90	....
New York	Included with Penna.	.....	25	5
Utah	Included with Colorado.	.....	104	....
Indian Territory	59,255	24,339	130	100
Wyoming	32,100	15,630	74	....
Kansas	26,988	14,476	95	....
Missouri	5,320	2,860	12	....
Indiana	.....	.....	52	....
Illinois	4,217	2,370	130	26
	30,219,343	19,668,569	49,667 (of which 508 are by-product ovens.)	4,037

NOTE.—The figures given for Pennsylvania State include the coke from the by-product ovens in Massachusetts and New York; which, however, is not large enough to materially affect the calculations herein submitted.

The table shows; first, the tonnage (2,000 pounds) of coal used in 1899 in coke making; second, the coke produced therefrom; third, the number of ovens in operation Dec. 31, 1899; fourth, the number of ovens building in the same year.

From which it will be seen that in the whole of the United States in 1899 there were 30,219,343 tons of coal converted into coke by coke oven processes, and 19,668,569 tons of coke produced therefrom. The relative consumption of coal and output of coke in each State will be seen by reference to Mr. Parker's table.

Probably about 95 per cent. of this vast quantity of coal is carbonized in ovens from which coke is the only product and consideration, and 5 per cent. only carbonized in by-product ovens. The gas, the tar and the ammonia from the old style ovens go absolutely to waste. Let us glance at what this colossal waste amounts to.

Assuming that with by-product or retort ovens, after deducting the necessary gas used to heat the ovens, 4,000 feet per ton of coal can be recovered, and that this can be done is beyond question—it is being done on a large scale in a number of places day in and day out the year round, and has been so carried on for a number of years—it means that the gas wasted from the manufacture of coke, as at present generally carried on in the United States, is about as follows:

And, take first the State of Pennsylvania alone, in which the coke business is about 65 per cent. of that of the entire United States. It should here be noted that Mr. Parker's figures for Pennsylvania include Massachusetts and New York State; but inasmuch as the make of coke in these two States is small in comparison, it does not materially affect the calculations.

The coal consumed in coke making in 1899, in Pennsylvania alone, according to Mr. Parker's figures, was 19,930,419 tons, and the coke produced therefrom 13,577,870 tons.

Assuming the recovery of 4,000 feet of gas per net ton (at present wasted from old style ovens) it would equal 79,721,676,000 cubic feet per annum, equal to 12,649 feet per capita of the entire population of Pennsylvania (as given by Rand & McNally at 6,302,155), which is about double the per capita consumption in our largest cities, and four or five times the average per capita consumption in all the cities of the United States, outside the five largest ones. It is equal to the supply of 10 cities the size of Philadelphia, with its population of 1,294,000, and allowing for the consumption of 6,000 feet per capita of its population per annum. It is equal to the supply of 40 cities of the size of Pittsburg, with its 325,000 population, assuming a consumption of 6,000 feet per capita of population.

It is equal to the supply of nearly 4 (actually 3.8) cities the size of Greater New York, with its 3,437,000 inhabitants, on a basis of 6,000 feet per capita per annum.

It would equal the output, nearly 17 times over, of 25 of the largest gas companies in Massachusetts, as per the following list, the figures of which are taken from the valuable report of the Massachusetts Gas Commission. These 25 places average an actual consumption, per capita of the populations of the districts supplied, of 2,245 cubic feet per annum.

As proof of this assertion, the figures in the report of the Massachusetts Gas Commissioners, published in 1901, show that in 25 of the largest gas companies in that State, the output (gas sold and used) was equal to 2,245 feet per capita of the population of the districts supplied; and ranged, from the Boston Gas Light Company, 6,573 cubic feet per capita, down to some of the smaller cities, with less than 1,000 cubic feet per capita per annum.

OUTPUT (GAS ACCOUNTED-FOR) OF 25 OF THE LARGEST GAS COMPANIES IN MASSACHUSETTS IN 1900.

Order of Rank.	Gas sold and used in Thousands.	Population of Districts Supplied.	Consumption per capita of Population.
1. Boston Gas Light Co.	1,097,648	167,000	6,573
2. Brookline	676,029	438,000	1,543
3. Lowell	347,894	106,000	3,282
4. Cambridge	277,547	92,000	3,017
5. Worcester	264,904	118,400	2,237
6. Roxbury	233,372	105,400	2,214
7. Dorchester	231,180	84,000	2,752
8. Lynn	186,203	78,000	2,387
9. Fall River	169,957	105,000	1,618
10. Springfield	153,126	70,000	2,656
11. Lawrence	140,058	74,000	1,892
12. Charlestown	136,366	67,000	2,305
13. South Boston	119,259	68,000	1,753
14. Newton and Watertown	101,898	50,000	2,038
15. Jamaica Plain	87,839	98,500	892
16. New Bedford	83,409	62,400	1,336
17. Malden and Melrose	82,476	46,000	1,793
18. Salem	57,713	47,000	1,228
19. Taunton	54,600	31,000	1,760
20. East Boston	51,088	46,000	1,110
21. North Adams	43,180	24,200	1,784
22. Brockton	40,411	40,000	1,010
23. Chelsea	33,582	34,000	988
24. Fitchburg	25,045	31,500	795
25. Northampton	24,120	18,600	1,297

4,718,904,000 ÷ 2,102,000 = 2,244

It is equal to more than double the combined output of the 3 great gas companies of London, England, viz.: The Gas Light and Coke Company, the South Metropolitan Gas Company, and the Commercial Gas Company; and this, bear in mind, from the State of Pennsylvania alone. And a safe estimate of the value of this gas, and other products now being wasted, would be about as follows:

Gas at 10 cents per 1,000 feet only, the value would be	$7,972,167
Tar, say, 8 gallons per ton, at 2 cents per gallon	3,189,867
Ammonia, at 16 pounds per ton only, at 2½ cents per pound	7,972,167
Or a total result, in products wasted, of	$19,133,201

per annum, every dollar of which may be saved.

And, taking the whole of the coke ovens in the United States, on the same basis of calculation, viz.: 4,000 feet only of gas recovered from 2,000 pounds coal, then, with a consumption of coal, as shown by Mr. Parker in the annexed table, of 30,219,343 tons, the gas wasted is 120,877,372,000 feet per annum. Sufficient to supply the whole demand, of the 40 largest cities in the United States, allowing a consumption, per capita, of 8,400 feet per annum, for the combined populations, aggregating upwards of 14 millions of inhabitants (14,373,828) as per the accompanying list of cities with their populations, as taken from the World Almanac for 1901; and this allowance of 8,400 feet per capita is certainly more than double the actual average consumption in the whole of the 40 cities, so that the gas which might be saved, in the manufacture of coke, in the whole of the United States, by the use of retort ovens, would be more than sufficient to supply such a list of cities as given twice over.

And as the increase in coke making goes on in the United States at the rate of about 1,200 ovens, or about 1 million tons of coal per annum, this represents 4,000 millions cubic feet further waste; nearly equal to the supply of the 25 largest cities in Massachusetts, with their aggregate population of 2,102,000. It would furnish them with 2,000 feet per capita per annum out of 2,244. And this is simply the annual increase in the waste.

THE FORTY LARGEST CITIES OF THE UNITED STATES AND THEIR POPULATIONS IN 1901, AS GIVEN BY THE WORLD ALMANAC.

Greater New York, N.Y.	3,437,000	Kansas City, Mo.	163,752
Chicago, Ills.	1,698,575	St. Paul, Minn	163,065
Philadelphia	1,293,697	Rochester N. Y.	162,608
St. Louis, Mo.	575,238	Denver, Col.	133,859
Boston, Mass.	560,892	Toledo, Ohio	131,000
Baltimore, Md.	508,957	Allegheny, Pa.	129,896
Cleveland, Ohio	381,768	Columbus, Ohio	125,560
Buffalo, N. Y.	352,387	Worcester, Mass.	118,421
San Francisco, Cal.	342,782	Syracuse, N. Y.	108,374
Cincinnati, Ohio	325,902	New Haven, Conn.	108,027
Pittsburg, Pa	321,564	Paterson, N. J.	105,171
New Orleans, La.	287,104	Fall River, Mass.	104,863
Detroit, Mich.	285,704	St. Joseph, Miss	102,979
Milwaukee, Wis.	285,315	Los Angeles, Cal.	102,479
Washington, D. C.	278,718	Scranton, Pa.	102,026
Newark, N. J.	246,070	Lowell, Mass.	94,969
Jersey City, N. J.	206,433	Albany, N. Y.	94,151
Louisville, Ky.	204,731	Cambridge, Mass.	91,886
Minneapolis, Minn	202,718	Portland, Ore.	90,426
Providence, R. I.	175,597		
Indianapolis, Ind.	169,164		14,373,828

To further emphasize the extent of the present enormous waste of gas in coke making operations, and as a confirmation of the fact that I was well within bounds, in my previous figures in reference thereto, the following data is submitted, taken from another report of the U. S. Government, which was issued from the Department of the Interior, on "Illuminating and Fuel Gas and By-products," by Mr. William B. Phillips, dated 1899, and giving results for the year 1898.

It shows that the returns from 433 gas companies in various States, sent in as called for by the Government, were as follows: Massachusetts heading the list with 45 companies; New York State and Ohio with 41 each; California and Illinois 26 each, Pennsylvania 22; Michigan 21; Indiana and Missouri 13 each, and so on.

The production of gas in these 433 cities and towns, is given in round figures as follows: Coal gas, 19,469 millions cubic feet; water gas, 30,419 millions cubic feet; oil gas, 497 millions cubic feet; total gas made per annum, 50,385 millions cubic feet.

The coal used in making the above quantity of coal gas was 2,042,698 net tons, showing an average production in coal gas of 9,531 feet per net ton. So that the coal used in coke making in the United States (as given by Mr. Parker at 30,219,343 net tons) is upwards of 14 times as great in quantity as that used in coal gas making in the 433 cities and towns just referred to. And the gas wasted therefrom (taking it at 4,000 feet per net ton, which could easily and profitably be recovered) would supply the 433 cities and towns with gas at their present total rate of consumption of coal, water and oil gas 2⅛ times over; which greatly exceeds my previous conservative calculations. When this gigantic stream of waste shall be converted into a stream of profit, as it will surely be in the not distant future, it will very considerably alter the present aspect of gas affairs in many sections of the United States. There have been some notable and costly experiences to gas companies in this country in the past, and history has a remarkable tendency to repeat itself, especially along favorable lines; it will be well for us, as gas men, to do all in our power to use any new forces that may be developed along the lines of the industry in which we are all so deeply interested, rather than let them get away from us.

Another indication of the possibilities of the extension of the coke business. Only recently the Erie Railroad Company has given out that it will abolish the use of soft coal on its passenger trains, out of consideration for the traveling public, and there can be no question but that such a step will remove one great discomfort in railway travel.

It can safely be predicted that other railroad companies will follow suit. In fact, one of the New England railroad companies has already, to a considerable extent, adopted coke as locomotive fuel. And when coke can be made and sold with a reasonable margin of profit, at considerably lower prices than hard coal (except for the buckwheat and smaller sizes of anthracite, which until the last few years had been mostly waste), the coke business will grow.

That this enormous waste just referred to can, and will, eventually be avoided, is beyond question. In some parts of Europe the by-product retort oven has practically driven the beehive oven out of the field, because the fact has been so abundantly proven, that a considerably larger percentage of coke from a given quantity of coal can be produced from the retort oven than from the beehive, for the reason that in the beehive there is a large waste, partly by the admission of air to burn the gases inside the oven to heat the oven itself, and also in other ways that need not be detailed here; while the retort oven is externally heated by a portion only of the gas produced, which is entirely wasted in the behive; and to-day it is a great anomaly to find that this great, progressive country has, in this respect, lagged so far behind other countries by sticking to the old beehive oven. Fortunately for the great coke making industries of Pennsylvania, they have been so prosperous, and profits have been so satisfactory, that the savings to be effected by the recovery of the by-products have hitherto been almost entirely ignored. But the conditions of modern commercial enterprise and activities make it impossible for such known waste to be permitted for very long.

As existing sets of ovens wear out, and renewals have to be effected, the shrewd and able men at the head of the coke business cannot afford to overlook the possibilities of improvement; nor are they likely to do so, because the matter is no longer one of doubt or question, but of abundantly demonstrated facts, the proofs of which are easily obtainable. And if they do ignore the matter there are others who will probably not be slow to take advantage of the opportunities presented.

The effort being made in all progressive cities and towns for the suppression of the soft coal smoke nuisance is opening such a field for smokeless fuel, that, with hard coal at present rates, it should create such a demand for vast quantities of coke as may, and probably will, change the factor of the problem from the gas to the coke side of the question in the not distant future.

A very significant remark in the report of Mr. Parker is as follows:

"There seems to be no reason to doubt that the by-product ovens will eventually supersede the beehive, at least in great part. The question as to whether the coke from these retort ovens is the primary product or the by-product, is determined by the location of the plant, and the demands of the particular locality."

It seems to me quite safe to take a step further than this and say that as coke for foundry and other purposes is used in all parts of the country, and has to be freighted there from the centers of coke production, there is no reason whatever why the coal should not be freighted instead of the coke to the centers where the gas and other by-products can be more readily and profitably disposed of. And, therefore, as the use of the by-product oven is extended as it will be the gas aspect of the question must not be lost sight of by gas men, who must be prepared to meet the changing condition of the gas business due to the use of retort ovens for coke making.

The products from retort ovens are practically the same as from the ordinary retorts. Analyses in the appended table abundantly prove that the gases from the oven and the retort are so similar in every respect as to enable it to be said that there is practically no difference between

ANALYSES OF COAL GASES, AND GAS FROM SEMET-SOLVAY RETORT OVENS.

		Paris.	London Gas Light and Coke Co.	London South Metropolitan.	Liverpool.	Bristol.	Birmingham.	Leeds.	Notingt-ham.	Brighton.	Norwich.	Newcastle on Tyne.	Shefield.	Average of the 12 foregoing.	Semet-Solvay Ovens 35 per cent. Volatile Coal.	Dr. E. G. Love. Manhattan Coal Gas.	Dr. E. G. Love. Harlem Coal Gas.
Reported Ill. Power.....	..	..	16.	16.	21½	17.	17¼	18.	18½	14.	14.	16.	18.	..	..	..	..
Carbonic Acid.....	CO_2	1.72	..	0.09	1.70	..	1.50	0.34	.81	0.3	0.27	0 28	0.24	.69	1.3	..	1.08
Olefiant Gas (or Illuminants)	C_2H_4	4.94	4.41	2.92	7.90	4.58	4.76	7.28	5.63	3.76	3.26	3.62	6.28	4.94	3.4	6.38	6.31
Oxygen	O	..	0.26	..	0.19	0.27	0.36	0.07	0.24	0.23	0.14	0.23	0.10	0.21	.45	..	.06
Carbonic Oxide.....	CO	8.21	3 75	4.11	3 39	4.77	4.05	5 02	5.63	4.14	3.40	3.37	4.72	4.54	6.0	6.31	6.14
Methane or Marsh Gas.....	CH_4	35.03	37.64	36.55	44.28	40.70	39.	42.74	39.66	38.15	36.11	36.71	43 05	39.13	33.5	39.01	39.38
Hydrogen.....	H	50.10	47.99	53.14	36.44	44.57	40.23	40.23	45.52	51.62	53.79	50.50	43.05	46.46	50.45	45.79	46.53
Nitrogen.	N	..	5.95	3.19	6.10	5.11	10.10	4 32	2.51	2.07	3.03	5.29	2 56	4.56	4.9	2.51	.5
		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

NOTE.—The figures for the Paris and British gas companies are taken from Mr. Norton C. Humphry's "Chemistry of Coal Gas."

them, except that in the gas from the retort ovens, mainly on account of the larger mass of coal carbonized at a time, the longer periods of distillation, and the leaner coals generally dealt with, the illuminating power of the average gas during the whole period of distillation is not quite so high as that from the retorts. With coals of the same high percentage of volatile matter as ordinarily used in gas making, and with gas as a consideration, there is no reason why gas of quite as high illuminating power should not be obtained from ovens as from retorts.

The retort oven offers one great advantage from this standpoint over the retort, in that it permits a very simple and effective method of separating the gases at different periods of distillation, which is not practicable with the retorts and would be no advantage with them. Every gas man knows that in coal gas making the richer gases come off from the retorts in the first half of the charge; as a matter of course it is also the same from the ovens, and two separate hydraulic mains being provided, the rich gases are taken off for lighting purposes and the later, non-illuminating portions, which are of great heating value, are utilized for heating the retort ovens. Not only so, but as the gas from the latter half of the charge contains a considerabe portion of benzene which has a very high illuminating value, this benzene can be readily and economically extracted from the poorer gases that are to be used for heating and added to the richer portion set apart for lighting, enriching the latter to such an extent as to enable gas of say 20-candle power or over to be obtained from a coal that, from the retort gas making standpoint, would be considered a very poor one, and scarcely worth the handling for gas making.

As the by-product retort oven has been so frequently and so ably dealt with by others, from the standpoint of its construction, especially by Mr. W. H. Blauvelt, of the Semet-Solvay Company, whose excellent paper on that subject will be found in "The Mineral Industry" for 1895, and by the exhaustive work of Mr. John Fulton, whose treatise on "Coke and the Saving of By-Products" contains a mine of information on the subject, and by many others, and the fact proven over and over again that coke can be produced at cheaper rates per ton in a retort oven than in a beehive oven, and how a retort oven will produce coke in 22 to 24 hours equal to the 72-hour production of the beehive oven, I need not deal further with the phase of the question. The subject has impressed itself on my mind more from the gas side of it than any other, because I realize what it means to the gas industry in the future.

I would here refer to the paper of Mr. Peter Young, presented to the Ohio Association, last year, to be found in the AMERICAN GAS LIGHT JOURNAL, of April 16, 1900, in which that gentleman gives 30 cents per ton of coal as the cost of carbonizing in retort ovens. I can say from actual knowledge of the facts, which I have daily observed for some months, that it is very much below that figure—viz., under 20 cents per ton—the coal handled per man employed (excluding foreman) is 12.8 tons per day, and the question of labor is a very important one. In this connection I refer to "Field's Analysis of British Gas Companies Accounts," dated 1901, for year 1900, which shows that in, 35 of the principal gas companies and corporations of that country, the costs of carbonizing wages are as follows, and shown in tabular form herewith, from which it will be seen that in—

3 London companies,	carbonizing	wages	= 70c.	per ton	(2,000 lbs.)
12 Suburban	"	"	= 69.3 c.	"	"
9 Corporations,	"	"	= 60c.	"	"
8 Provincial companies,	"	"	= 68.4c.	"	"
2 Scottish	"	"	= 66.2c.	"	"
Dublin,	"	"	= 79.8c.	"	"

Average of the above 35 companies = 69., which is 3.4 times the cost in the United States in retort ovens, notwithstanding the higher rates paid for labor in this country. It is not an easy matter to get as full data as one would like in this country, but from facts that I am acquainted with in various places I think, in view of the much higher rates paid to American workmen, that 95 cents per ton is about a fair average for carbonizing wages in the United States, and at this figure it would be 4¾ times the cost of carbonizing labor in retort ovens. These are simple, cold facts.

The first retort ovens erected in this country were erected in 1893 by the Solvay Process Company, at their works in Syracuse, N. Y., to produce the coke required to burn the vast quantities of lime used in one branch of that Company's business. The Company also required large quantities of ammonia, and the ovens were put up primarily to supply those demands. Since then these ovens have been gradually developed for the recovery of all the by-products from the operation of coking coal, gas among others.

The *Journal of Gas Lighting*, in an essay (June 11th) on "Coke Oven versus Gas Works Coal Carbonizing Plant," said: "All com-

RETORT OVENS VS. RETORTS IN GAS WORKS.—*Comparative Statement on Carbonizing Labor.—The data for the British Companies taken from "Field's Analysis" for* 1900,

	Gross Tons Coal Used.	Gas made in Thousands.	Carbonizing Wages Paid.	Carbonizing Wages Per Gross Ton.	Carbonizing Wages per net Ton.
3 London Companies, totals and averages...	3,249,955	36,611,884	£523,377 — $2,548,846	C. 78.4	C. 70.
12 Suburban Companies, totals and averages...	611,408	7,865,984	£97,537 — $475,005	77.7	69.3
9 Corporations, totals and averages...	1,881,318	20,215,086	£257,900 — $1,255,973	66.7	60.
8 Provincial Companies, totals and averages...	1,063,823	11,751,466	£169,756 — $826,711	77.7	68.4
2 Scottish Companies, totals and averages...	826,464	7,851,796	£125,968 — $613,464	74.2	66.2
Dublin	125,788	1,556,859	£23,095 — $112,472	89.4	79.8
Average of the above 35 gas companies and Corporations				77.3	69. = 3.4 times cost in ovens
U. S. coal gas works....	.....	.....	....say...	....	95. = 4¾ times cost in ovens
Semet-Solvay, retort ovens.....	.....	.....	.....	....	20.

petent readers of the signs of the times in respect of the technicalities of towns' gas production must agree that the best and most advanced professional opinion is at the moment at a state of suspense on the question of what is to be the line of development of gas manufacture in the immediate future."

And it goes on to point out how the factors are gradually changing from the question of light units to heat units, and the great change that may be expected when in 1893 patents of the Welsbach Company expire in 1907. And the "Journal," referring to some remarks made by one of our esteemed fellow members of this Association, says, "Mr. Egner starts by admitting, as proven, that the by-product coke oven is a 'long way ahead' of older methods of coke manufacture; but this is precisely what the largest manufacturers of metallurgical coke in the United States, in the far famed Connellsville region, do not concede." Of course, they do not concede it, neither could they be expected to concede it, for the simple reason that hitherto the Connellsville region and operators of that section have practically controlled the coke making industry, and they could not afford, especially at the present stage, to admit that coke made from other coal and by other methods than theirs was as good as theirs; and they never will admit it, while their product is beehive coke. But the users, the great steel and iron makers, are rapidly learning the fact, and find that retort oven coke can be and is made in every respect equal to beehive coke and cheaper. And it is no secret that the greatest obstacle so far to the introduction of retort ovens has been the systematic endeavor of the beehive oven men to persuade foundrymen and others that retort oven coke was not as good as that from beehive ovens. The reaction will be all the stronger against the latter when the true facts are fully realized. Some of us butted our heads against that kind of a stone wall on the water gas question; and, while eating crow is certainly not as satisfactory as taking quail on toast, the opponents of the retort oven will sooner or later have to partake of the first-named, unpalatable dish, and it is on that line the battle has to be fought and won, as it will be.

I have gone into this question of retort oven versus coal gas retort very carefully during the last few months, and have taken it, I think, from all standpoints; and from comparisons of the actual work being done day by day in Semet-Solvay retort ovens, and of the very best average results I know of being obtained in the ordinary retort processes in gas works in both the United States and in Europe, and knowing as I think whereof I speak, I am prepared to go on record with this statement.

In gas works of even moderate size, operating with retort ovens, and turning out a first-class foundry coke for which there is a large demand at good prices, good substantial profits can be made, with gas at such prices as would be utterly and absolutely impossible for retort methods to compete with.

I have some carefully prepared statements which I think prove this beyond question, but as I think it undesirable in the interest of our business to give the details and figures for publication, I shall be happy to go through them with any member or members of this Association personally. When the retort oven, from the same quality coal, can put out 72 per cent. of its weight in coke against 66 per cent. in beehive ovens, do it every day in the week and every week in the year, and of equal quality, that and time settle the question from the coke standpoint. And when lean coals, with a low percentage of volatile matter, coals that are not usually classed as suitable for gas making can be used and give off as a by-product 4,000 feet per ton, which is at present going to waste all over the country, to the extent of a supply, as shown, equal to 2½ times the quantity consumed in 433 cities and towns (as shown by the U. S. Government report I have quoted), it will surely be evident to my brethren of the gas fraternity, that, as "coming events cast their shadows before," it should be the policy, pleasure and profit of gas men to grasp the substance as it comes along; and they can be trusted to do it, too.

A Comparison of Inclined and Horizontal Arc Lights.

The *Journal* of the Worcester (Mass.) Polytechnic Institute reports the findings of Messrs. Adams, Day, C. F. Harding and Sigourney, of the Institute's Physical Laboratory, in connection with their studies over the topic named in the heading. The students say:

It is occasionally desirable to get as great an illumination as possible in one particular direction, as. for instance, in the case of a light used in a projection lantern, where a maximum of intensity in a horizontal direction is needed. As is well known, the maximum intensity from an arc light with vertical carbons is not in a horizontal direction but at an inclination downwards. A method frequently employed for increasing the horizontal illumination is to tilt the axis of the carbon slightly and displace the positive carbon a small amount backwards. In other arc lights the same end has been sought by placing the positive carbon in a horizontal position and leaving the negative one vertical, so that the hottest and brightest part of the positive carbon may throw an unobstructed beam horizontally. Both types have been used in the physical lecture room at the Institute, and a comparison of the two seemed desirable.

The Reichsanstalt photometer was used for the measurements and, as a standard of comparison, a very large incandescent lamp, on a separate constant current circuit, was employed. By frequently changing the arc lights studied, the danger of error due to deterioration of the standard was avoided. Carbons also were frequently changed.

The adjustment of the carbons was by hand, and in each case the light was kept adjusted so as to give as high an illumination as possible. The difficulty of arc light photometry arising from the wanderings of the arc around the carbons is well known. In the present case the device of two reflecting mirrors placed behind the arc, so successfully employed by Dr. Matthews, of Purdue University, was not available, since it could not be applied to the horizontal type of light. Under these circumstances the only method possible was to multiply the number of readimgs at any particular current and take the mean. The intensities of the two types of light relatively to the incandescent lamp are given for different watts expended in the following table:

Mean Watts.	Inclined.	Horizontal.
450	3.3	2.0
550	5.5	2.3
650	6.7	2.6
750	8.1	2.6

From the above it is evident that, under these conditions, the inclined type of light is superior, and that its superiority becomes more marked the greater the energy expended. Two qualifications to this statement should be made: First, that the manipulation was comparatively inexpert, and experience in adjustment might considerably alter the above figures, but could hardly affect the general conclusion; second, that the horizontal type has one point of superiority, namely, the greater ease with which in a projection lantern it can be kept in focus. The inferiority of the horizontal carbon type is probably due to the unfavorable position which the arc tends to assume; namely, on the lower side of the positive carbon.

The Value of a Recommendation.

Mr. Albert Stritmatter, writing in *American Manufacturer*, remarks that there are various kinds of recommendations as well as different degrees of the same kind. First, there is a recommendation from a friend or an employer as to the character and ability of the person recommended. Second, there is the recommendation from a customer as to the integrity of a business man or firm, or as to the quality of its products. Either of these classes of recommendations may be made with or without the knowledge of the person or persons referred to, or they may be given direct to the persons to show to whomsoever they wish. Did you ever think how much a recommendation is worth? If you have not, a little thought on the subject might surprise you. And, on the other hand, have you ever thought how very little a recommendation may be worth. If you have not, I am sure you would be surprised by the results of a little reflection on the subject.

There is no doubt that the practice of giving letters of recommendation to everyone who asks for them has resulted in great abuses of what might otherwise be a very beneficial as well as a worthy system. There is no one or no thing which is so bad that some good things may not be said of him or it, and so most people, either through their inability to refuse such a request or through their desire not to prevent anyone from getting a position or an order, even if not deserved, comply with every request for a recommendation and say something which may or may not be the truth, but which at any rate in a great many instances is not the whole truth. If they are writing a recommendation for an incompetent workman, they can at least say that he is "sober, industrious and honest." By the way, did you ever notice that in describing the qualities of a man most people will invariably use three adjectives, never more or less than three? Or, if the man gets "pay-day sickness" once in a while, they can say he is a "good, competent and industrious" workman. The result of this practice is that you generally find from a recommendatiou that a man has several good traits but you do not know anything about whether these are the only good ones he has or not. I have known employers to discharge men and then give them letters stating they were "sober, industrious and competent," when it was the lack of these very qualities that brought about their discharge. For instance, I knew a foundry foreman who was discharged for lack of a proper influence over his men, brought about by the continued use of

intoxicating liquors. He had been warned, but did not cease and was finally allowed to go. This man received a letter stating he was a competent foreman.

On the other hand, if an employee has shown himself to be really competent and industrious, as well as sober, a recommendation may do much for him. This is the class of men who suffer from the indiscriminate recommendation of everyone, good, bad and indifferent. Their letters are worded similar to many of the other kind and on the surface one man might be as good as the other. While I myself have secured several positions on the personal recommendations of some of my friends or former employers, my experience has been that the ordinary business man cares very little for a written recommendation, and I have seen several men who cared so little for them that they would not even read them over, for they said: "Anyone can get recommendations. What do they amount to, anyway?" As before stated, it is the indiscriminate and promiscuous giving of these letters that has brought them to so low a valuation. If the men who write these letters would be careful to recommend only such men as they would like to have recommended to themselves by others, it would simplify matters greatly and bring recommendation by letter into better repute generally.

A part of the abuse of recommendations is brought about by unworthy persons referring to former employers and trusting that the old employer will not say anything of his unworthy characteristics. For example, several years ago a young man was employed in a bank and in some way or other pocketed some $300 of the bank's money before it was discovered. His father made up the loss, himself going into voluntary bankruptcy as a result, and the public never knew of the circumstance. Of course, the young man in question lost his position. About three years later he secured a position in which it was necessary for him to give a bond, and in his application to a guarantee company he referred them to the bank where he had been previously employed. The officers of this bank replied to an inquiry from the guarantee company, simply stating that the young man in question had left them under rather uncomplimentary circumstances. This, of course, led to further inquiries, and they finally told the complete circumstances of the case. If they had followed the policy of many a business man they would have placed this young man in a position to cause possible loss to others. Of course, in such cases consideration must be had for the party involved and he should not be continually "ground down," but he, of course, must realize that there is a black mark against him and he has to work under great odds to overcome it.

Then there is the second class of recommendations; that where a business man or his products are referred to. Everybody uses them to advertise his business. You can hardly get a catalogue or circulars of machinery or other products, especially the so-called "patent medicines," in which they do not appear in great quantities, being usually known as testimonials rather than recommendations. Are they of any value? Do they ever influence you in your purchases? If so, they would probably influence your customers too. Perhaps you will say they do not influence you, but a little reflection will show that they probably do. Suppose you were going to buy a piece of machinery and received catalogues, etc., from different concerns making such a line. You would, perhaps, read them over carefully until you came to the pages of testimonials, when you might read a few or only look at some of the names to see if there were any letters from firms personally known to you or in the same line of business with you. What would you think of a firm which tried to sell its products without letting prospective customers know where some of its machinery or goods were being used? The very absence of these testimonial letters would prejudice you against that firm. You would think that such a concern must just have started in business or else that it did not recognize the value of recommendations.

It is rather curious to note what kind of testimonials some people demand. For instance, the engine manufacturer is besieged with requests for recommendations from every kind of business. The miller wants to know of another miller using one of the engines. The mattress maker, the harness maker, the thresherman, the blacksmith, all want to know of an engine being used in their own particular line. No other business will do as well as their own. The same is true of a great many kinds of goods. Every prospective purchaser wishes to know if he is buying something which others in his line are using. Every man who has started into a new business with a product which has not been on the market, knows the advantage of recommendations, or at least the disadvantage of not having them, for he knows that because of the lack of them he has been unable to secure many an order.

Everyone in business knows that if his customers are satisfied they will be continually bringing him trade from their unsolicited recommendations, and so, in making up an inventory of his business, he puts in an estimate for "good will." "Good will" is valued not only by what the past customers themselves will buy in the future, but also by the amount of business their recommendations will bring from others.

To sum it all up, then, we find that recommendations of either of the classes named are worth a great deal, depending on the circumstances under which they are given. If known to express all the truth instead of only a part of it, they are of exceptional value. On the other hand, if known to be of a promiscuous character, no matter whether recommending a person or his products, they decrease in value accordingly, and because of this characteristic they also depreciate the value of legitimate testimonials.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

MR. WILLIAM T. MORRIS, of Penn Yan, N. Y., and his associates have organized the Ithaca (N. Y.) Light and Water Company, under the laws of the State of New York, for the purpose of taking over the properties of the Ithaca Gas Light Company and those of the Ithaca Water Works Company. The new corporation, which is capitalized in $400,000, will own the stock of the merged companies, but the organizations of the latter will be maintained. Many changes will be made in the management.

IN the hearing before the Board of Gas and Electric Light Commissioners of Massachusetts, on the petition of the Newton and Watertown Gas Light Company for the right to increase its capital stock in the sum of $50,000, no remonstrance or opposition was made. The company submitted an itemized statement respecting how the sum named was to be expended.

THERE is much dissatisfaction expressed in Attica, N. Y., over the action taken by the proprietors of the Attica Water, Gas and Electric Company in ordering an increase in the selling rates, which increase became effective the 1st inst.; so writes a correspondent, whose communication is dated November 7th. He adds: "The company has supplied natural gas only for some time, and the charges therefor under the new schedule have been increased on an average of 60 per cent. For instance: Gas used solely for heating and manufacturing purposes is now 40 cents per 1,000—it was 30 cents; for lighting use only the charge is 50 cents—it was 30 cents; for lighting, heating and manufacturing use the rate is 35 cents—it was 30 cents. In addition, a certain sum (10 cents) is charged for each mantle used per month on illuminating account. The company claims that the increase had to be made because the supply of natural gas is rapidly failing."

THE Florence Gas Company, to supply the residents of Florence, Burlington county, N. J., has been incorporated with a capital of $10,000. The main nominal parties in interest are John J. Burleigh and H. C. Robinson, but it is more than likely that the real proprietors are the capitalists interested in the South Jersey Gas, Electric and Traction Company, of Trenton, N. J.

THE briefs of Mr. Franklin D. Locke, for the Buffalo (N.Y.) Gas Company, and of attorneys Ryan and Spitzmiller for the City of Buffalo, have been filed with Judge Volger in the Municipal Court, the case at issue being the legality of the company's action in charging a "minimum sum" per month to those who have its meters in use. Mr. Locke contends that the charge referred to is not a charge for the use of the meters, but that it is a charge for service, which service consisted of keeping the meters in order on the premises of the consumer, the inspecting of such meters, the rendering of bills, the issuing of receipts, etc. Mr. Locke contends further, in case the evidence as presented (the test case was formally tried some time ago) is held by the court to constitute a cause of action, that the statute which prohibited a gas company from charging but for the use of the meters is unconstitutional, in that it deprives the company of property without due process of law and restricts it in its lawful right to do business. The brief submitted by the city's attorneys declares that the evidence presented shows that the charges in reality are for the *use* of meters, and in support of the contention cites the notices sent to the consumers and published in the newspapers giving the minimum rates to be charged on meters of different sizes. They allege that if the charge were a service charge only it would be the same on meters of all sizes; that it costs no more to render bills and inspect large meters than small ones, and that the very fact that the charges are not uniform is evidence of the intention of the Company to charge for the use of meters, basing such charges on the value of the meters according to differences in size. The city also alleges that the law prohibiting the imposition of charges for the use of meters is reasonable and just, and that the defendant, having a public franchise, is subject to legislative control in the matter of prices. The decision in this case is looked to with much interest.

MR. JACOB BAUMGARDNER, formerly of Staunton, Va., is in charge of the construction of the plant for the Slatington (Pa.) Gas Company. He hopes to have the system in running order by Jan. 10th.

THE merging of the properties of the Poughkeepsie (N. Y.) Gas Light Company with those of the Poughkeepsie Electric Light Company, under the title of the Poughkeepsie Heat, Light and Power Company, has been formally completed.

ON the 5th inst., one of the propositions submitted to the voters of Oelwein, Ia., was whether or not Mr. John G. Holmes and associates

should be granted the privilege of building and operating a gas works in that place. The voters assented to the proposition. Section 4 of the ordinance declares that, "In consideration of the privileges herein granted, the said John G. Holmes, his successors and assigns, agree to and with the city of Oelwein, by the acceptance hereof, to furnish fuel, illuminating and power gas to the inhabitants of the said city of Oelwein, at all reasonable places, at a price not to exceed $1.60 per 1,000 cubic feet, and to furnish and connect meters free of charge. *Provided*, however, that if in the future, by invention, discovery or otherwise, the cost of making such gas is materially diminished, then the Council shall have the right to require the said John G. Holmes, his successors or assigns, to make a corresponding reduction in such price; and provided further that a rebate of 10 per cent. shall be made to any consumer who shall pay the amount of his bill, less such reduction, at the office of the said John G. Holmes, his successors or assigns, in the city of Oelwein, in cash, on or before the 15th day of the month succeeding that for which his bill is made out." It is stipulated that work on the plant must be commenced within 12 months, and be completed in 18 months after the passage of the ordinance.

THE office force of the Essex and Hudson Gas Company, of Newark, N. J., were very pleasantly entertained by the proprietors of the Company the evening of the 30th ult. The session was held in the Company's building on Broad street. The social features of the entertainment were nicely carried out, and the purpose of the gathering as set forth was "to promote the social relations of its employees and to bring them into closer touch with the Company's interests. A formal address was made by the Company's Secretary, Mr. James P. Dusenberry, and Assistant Secretary W. H. Pettes read a paper suited to the occasion that had been prepared by Mr. A. H. Strecker, the Company's Chief Engineer—Mr. Strecker was unable to be present at the gathering, as he had not entirely recovered from the injuries received in the unfortunate accident that occurred on the works some weeks ago. Other features of the assembly were characteristic, short addresses. by Mr. George R. Gray, Vice-President of the Company, and by Mr. Frank D. Moses, Chief Engineer of the South Jersey Gas, Electric and Traction Company, of Trenton.

THE proprietors of the Waynesboro (Pa.) Gas Light Company have secured additional property adjoining their present site whereon to construct works necessary for the development of the Company's trading. The scheme of betterment includes the building of a storage holder and the placing of an adequate purifying system.

IT is likely that important changes will soon occur in the ownership of the Consumers Gas Company, of Johnstown, Pa., Mr. J. Lowber Welsh, of Philadelphia, Pa., who holds the controlling interest, having been brought to the point of naming a price at which he will part with his shares. People closely identified with the interests of the Cambria Steel Company are acting in the premises.

THE Bridgeport (Conn.) *Farmer* recently had something to say respecting the developments in the rehabilitation of the gas interests of that city, which remaking hinges on the coming together from a legal point of view of the respective owners of the Bridgeport Gas Light Company and of the Citizens Gas Company. That the "coming together" is a certainty admits of no doubt; the completing of the compact is a mere matter of legal detail. The *Farmer*, among other lines, printed these: "Contrary to predictions that have been made the Bridgeport Gas Light Comprny is to continue under its present management—Dr. I. De Ver Warner having succeeded as President, Mr. W. R. Higby, who was one of those who parted with his holdings. Secretary and Treasurer Frank B. Sammis will remain, and there is to be no change in the old force of employees. The statement of Dr. Warner, that the Company will remain a Bridgeport institution under local management, and will not become a part of any great foreign trust or syndicate, disposes of a score of rumors. The keenest interest, however, will be taken in the announcement that when the Citizens Company's plant becomes a part of the Bridgeport Gas Light Company's plant the manufacture of fuel gas will be discontinued in Bridgeport." The *Farmer* also quotes President Warner as having said: "The Citizens Gas Company has been losing money from the time it started, and the idea that gas can be manufactured and sold for from 25 cents to 40 cents per 1,000 cubic feet is a fallacy. During the past few weeks I have examined carefully the books of that Company, and I am prepared to state that it has cost the Company in the last 5 years $146,000 more than it received to sell gas at the price at which it was sold. The Bridgeport Gas Light Company does not propose to conduct a losing business."

IT is said that Mr. Hugh J. Grant, of this city, acting in conjunction with Messrs. W. F. Sheehan and A. N. Brady, is endeavoring to secure control of the gas and electric lighting interests of Memphis, Tenn., with a view towards "unifying and harmonizing" the same.

THE Capital City Gas Light Company, of Des Moines, Iowa, has notified the residents that prepayment meters will not be continued in service unless the gross returns therefrom are in excess of $1 per month. This does not mean that the gas supply will be cut off, for the Company also declares that it will replace the prepayments with meters of the ordinary type.

THE projectors of the Company to supply gas in and about Petoskey, Mich., the incorporation of which has been reported in the JOURNAL, have selected the title of the Petoskey, Bayview and Northern Gas Company as the name of the concern. It is capitalized in $400,000.

A CORRESPONDENT forwards the following: "The people who are backing the Riverside (Cal.) Light and Fuel Company have acquired a controlling interest in the Riverside Gas Company, through the purchase of the shares owned by Messrs. Hayt, Adair and Hays. The sale was negotiated by H. C. Brown, of Los Angeles, who had been very prominent in attempting to secure a franchise for an opposition company from the authorities. The Directors of the succeeding concern are: G. H. Dole and W. W. Wilson, of Riverside; and F. B. Braden, F. O. Johnson and W. F. Jordon, of Los Angeles. The latter has been placed in charge of the old Company's business, pending the formal transfer thereof to its successor, which change will probably occur the 1st prox. It is understood that the manufacturing plant will be reconstructed, and that the main system will be extended, both of which resolutions should have been adopted and carried out years ago."

THE Bakersfield (Cal.) Gas and Electric Light Company will this winter add three miles of pipe to its main system.

MR. HENRY W. MCLURE has been chosen chairman of the recently elected Board of Gas Trustees of the Wheeling (West Va.) municipal gas plant. The other members are Messrs. C. Halbitzer and A. Reitz.

A CORRESPONDENT forwards the following clipping from a recent issue of the Poughkeepsie, N. Y., *Eagle:* "On October 28th the Poughkeepsie Gas Company, which has served the people of this city for more than 50 years, went out of business, having transferred all its property and franchises to the Poughkeepsie Light, Heat and Power Company—the recently formed corporation which has acquired and consolidated under its control the electric light and gas business of this city. The passing out of an old established company like this is an event of some interest, and connected with it are some historical reminiscences worth recording. Among the pioneers in the manufacture of gas and its distribution for lighting purposes were the people of Philadelphia, who built the City Gas Works in 1835. Three years afterwards a second Company began operations in the Northern Liberties district of Philadelphia. Charles B. Dungan was the Secretary of the Northern Liberties Company, Jos. Battin was Superintendent, and Henry G. Ludlow was a clerk in the office. These three conceived the idea of organizing a firm for the construction of gas works and the introduction of gas into other cities, and under the firm name of Battin, Dungan & Co., backed by capital furnished by stockholders of the Northern Liberties Company, they went into this business on what was for those days a large scale. The gas works at Albany, Rochester and Syracuse, in New York, and at Paterson, N. J.; New Haven, Hartford and Bridgeport, Conn., and other places, were built by them. About 1848 or 1849 they came to Poughkeepsie and took up the matter here. Mr. Ludlow, then Superintendent of the works at Albany, was the leading spirit, and Mr. Henry D. Varick was the principal actor on the part of our citizens, and in 1849 the works began operations, the firm of Platt & Schram, publishers of the *Eagle*, being the first customer to have the gas introduced. Mr. Ludlow has become since better known as the inventor of the 'Ludlow Valve,' and the founder of the extensive Ludlow Valve Works at Troy. He is still living in that city, and it is interesting to know that it was while engaged in constructing the works here that he succeeded in perfecting the valve, and the first one was used on the pipes in this city. The first President of the Poughkeepsie Company was Henry D. Varick, and the first Secretary and Treasurer Capt. Samuel B. Johnston. Tyler Sabbaton was the first Superintendent. In the presidency Mr. Varick, after a long term of service, was followed by Edward S. Atwater, William H. Young and James M. Hadden. Capt. Johnston was succeeded as Secretary and Treasurer by Le Grand Dodge, who continued in office for many years, and then his place was taken by Edmond Young. There have been a number of superintendents, Mr. Sabbaton was succeeded in 1852 by William Cartwright, but next year Dr. Elvy Deyo took charge, his drug store being located on the corner of Main and Bayeaux streets, the works being on the latter street. John Cartwright, a brother of Edward, took charge about 1862, and most of our old citizens remember him, for he served a long time. He was an engineer of experience, having been employed on the Hoosac Tunnel before coming here. With him came Frank Tracy, who was his assistant, and whose son, John Tracy, took Mr. Cartwright's place as Superintendent when ill health caused him to resign. In 1875 Mr. Augustus L. Allen and Mr. George W. Harris started the Citizens Gas Company, and introduced the making of what is now known as water gas, the old Company having always used the process of coal distillation. Mr. James M. Hadden came to the city in that year, as Superintendent of the new Company, and it began operations in June, Smith Brothers being the first customer. In 1887 the Poughkeepsie Gas Company bought out the Citizens, and the two were consolidated on the 1st of December in that year, Mr. Hadden being continued as Superintendent, and Mr. Tracy as Manager. Its history since then is familiar, and without special incident."

The Market for Gas Securities.

Decided improvement was made in the market for city gas shares last week, although it may not be said that anything like an approach to real values was recorded. Consolidated closed to-day (Friday) at 216½ to 217, and the closing trades were done at prices which seemed to foreshadow better quotations. Some inquiry is in evidence for Standard common, but sellers are not seemingly disposed to accept the bids of would-be purchasers. Quotations for Mutual are entirely nominal. City gas bonds, notably New Amsterdam 5's, are in fair demand.

There is no particular change in the outward status of Brooklyn Union, which is utterly neglected so far as actual trades for transfer are concerned. Peoples, of Chicago, is active and weak, but it certainly is a purchase at the quotations. It closed to-day at 101¾ to 102¼. The Company has just acquired the valuable properties heretofore operated in Evanston and vicinity by the Northwestern Gas Light and Coke Company. Consolidated, of Baltimore, was in good demand last week, at prices 1¾ points higher than those recently made in it.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 Wall Street, New York City.

November 11.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	216½	217
Central Union, Bonds, 5's.	3,000,000	1,000	109	110
Equitable Bonds, 6's	1,000,000	1,000	105	
" 1st Con. 5's	2,300,000	1,000	115	118
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	298	302
" Bonds	1,500,000	1,000	00	102
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. .. Bonds, 5's	11,000,000	1,000	107	107½
Northern Union, Bonds, 5's.	1,250,000	1,000	106	108
New York and East River.. Bonds 1st 5's	3,500,000	1,000	111	115
" 1st Con. 5's	1,500,000		109	111
Richmond Co., S. I.	348,650	50	100	..
" Bonds	100,000	1,000	103	.
Standard	5,000,000	100	130	135
Preferred	5,000,000	100	150	155
Bonds, 1st Mortgage, 5's	1,500,000	1,000	118	..
Yonkers	299,650	500	120	.
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	208	212
" " Bonds (5's)	15 000,000	1,000	119	119½
Bay State	50,000,000	50	⅝	1
" Income Bonds	2,000,000	1,000	.	75
Binghamton Gas Works..	450,000	100	28	30
" 1st Mtg. 5's	500,000	1,000	95	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	6	7
" " Bonds, 5's	5,250,000	1,000	69	72
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Central San Francisco	2,000,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas & Elec. Co.	29,500,000	100	104⅛	104¾
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	106	107
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	60	65
Preferred	3,026,500	100	84	86
Consumers, Jersey City Bonds	600,000	1,000	102	103
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	62¾	63
Mortgage, 6's	3,600,000	..	..	115
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's.	910,000	..	..	..
Consolidated, 1st 5's	1,490 000		..	112
Consolidated Gas Co. of N.J.	1,000,000	100	12	14
" Con. Mtg. 5's	380,000	1,000	79	83
Consolidated G. & E. Co.'s., Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50		89
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	381,000	1,000	89	89½
" Inc. 5's	16,000	100	94	94½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	34	38
Fort Wayne	2,000,000	..	..	.
" Bonds	2,000,000	..	53	55
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	102	104
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	60	66
" Bonds, 6's	2 650,000	..	99½	101½
Jackson Gas Co	250,000	50	67	70
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	92½	94
Preferred	2,500,000	100	102	.
Bonds	10,000,000	1,000	..	108½
Lafayette Gas Co., Ind.	1,000,000	100		60
Bonds	1,000,000	1,000	48	55
Louisville	2,570,000	50	110	120
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	102½	108
" 6 per cent. scrip, due 1910	100,000	25	87	89
Montreal, Canada	2,000,000	100	182	184¾
Newark, N. J., Con. Gas Co	6,000,000	..	..	55
Bonds, 6's	4,600,000	.	..	103
New Haven	1,000,000	25	300	325
Nashville Gas Lt. Co.	1,000,000	100	110	..
Oakland, Cal.	2,000,000	..	46	47
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	101¾	102¼
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	46	46½
St. Paul Gas Light Co.	1,500,000	100	60	63
1st Mortgage 6's	650,000	1,000	82	85
Extension, 6's	600,000	1,000	.	..
General Mortgage, 5's	2,465,000	1,000	86	88

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DIVIDEND NOTICE.

OFFICE AMERICAN LIGHT AND TRACTION CO., JERSEY CITY, N. J., October 22, 1901.

The Board of Directors has this day declared a quarterly dividend of 1½ per cent., for the quarter ended September 30, 1901, on the preferred stock of the Company, payable December 2, 1901, to preferred stockholders of record at the close of business on November 9, 1901, at which time the transfer books of the preferred stock will close, and will remain closed until December 3, 1901. Checks will be mailed.

1377-3 EMERSON McMILLIN, President.

Position Wanted

BY A SUCCESSFUL MANAGER,

Who understands the gas business in every detail, from its manufacture to the office work. Has managed the affairs of his present company 11 years. Will be open for engagement after January 10th, 1902. References furnished.

1378-3 Address, "M.," care this Journal.

POSITION WANTED

By a man of 12 years' experience in all branches of the gas and electrical business. Has rebuilt several gas and electric works, including the mains of the gas works and the steam plants of the electric works. Has been with his present company for 5 years as superintendent. Reasons for changing are the best. Best of references given from all former employers. Will be open for position after Nov. 1, 1901. No objection to going to foreign country.

1376-4 Address, "MANAGER," care this Journal.

Wanted Position

As Superintendent of a Gas Company.

If you want a progressive and hustling man who will build up your business, and is practical in every department, write to "X7,"

1375-2 Care this Journal.

Situation Wanted

By a Superintendent of Many Years' Experience

In the manufacture and distribution of gas, laying mains and services, handling gas stove trade, repairing and setting meters, and all work pertaining to the business. Best of references. Address, "C. R.,"

1360-tf Care this Journal.

WANTED,

A Competent Superintendent,

Young man preferred, to take charge of a gas plant in a city of 6,000 population, in Nebraska. Prefer one who could take some stock in the company.

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1373-4 Care this Journal.

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TWO GOOD RETORT HOUSE STOKERS,

to work two benches of 3's (half-depth), one to each bench. Wages $65 and $60 per month. Address,

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SECOND-HAND EXHAUSTER.

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1 Five-foot Station Meter.
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HUMPHREY GAS ARC LIGHT,

The Best Light in the World

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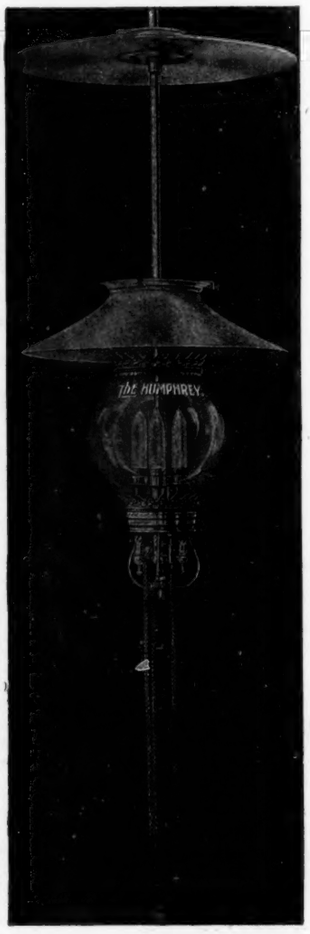
Stores, Churches, Halls or any large indoor areas.

Guaranteed to give a greater volume of light, better diffused and steadier, than an electric arc.



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LARGEST STOVE PLANT IN THE WORLD

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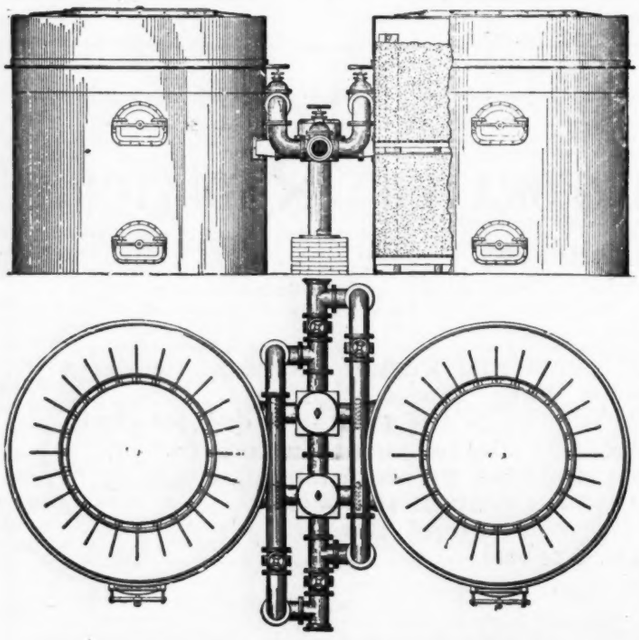

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The unauthorized use of any system or method of purification, whereby gas mingled with oxygen is made to flow in one general direction through the purifying mass, and then made to flow through the mass in a directly opposite direction, infringes the above patents!

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SOLE MANUFACTURERS,

CINCINNATI, O.

FIELD'S ANALYSIS

For the Year 1900.

An Analysis of the Principal Gas Undertakings in England, Scotland and Ireland. Being the Thirtieth Year of Publication.
Compiled and Arranged by

JOHN W. FIELD,

Secretary and General Manager of The Gas Light and Coke Company, London.

Price $5. For Sale by

A. M. CALLENDER & CO., - No. 32 Pine Street, N. Y. City.

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Saltley Works, Birmingham, England	2,000,000
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Saltley Works, Birmingham, England (Second Contract)	2,000,000
Windsor Street Works, Birmingham, England (Second Contract)	2,000,000
Halifax, England	1,000,000
Toronto	250,000
Ottawa	250,000
Toronto (Second Contract, Remodeled)	2,000,000
Lindsay (Remodeled)	125,000
Belleville	250,000
Ottawa (Second Contract)	250,000
Brantford (Remodeled)	200,000
St. Catherine's (Remodeled)	250,000
Kingston, Pa.	125,000
Montreal	500,000
Peterborough, Ont.	250,000
Wilkesbarre, Pa.	750,000
St. Catherine's (Second Contract)	250,000
Buffalo, N. Y.	2,000,000
Winnipeg, Man.	500,000
Colchester, England (Second Contract)	300,000
York, England	750,000
Rochester, England	500,000
Kingston, Ont.	300,000
Crystal Palace District, England	2,000,000
Duluth, Minn.	300,000
Caterham, England	150,000
Enschede, Holland	150,000
Leicester, England	2,000,000
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Burnley, England	1,500,000
Kingston-on-Thames, England	1,750,000
Accrington, England	500,000
Tonbridge, England	300,000
Stretford, England	500,000
Oldbury, England	300,000
Saltley Works, Birmingham, England (Third Contract)	2,000,000
York, England (Second Contract)	750,000
Rochester, England (Second Contract)	500,000
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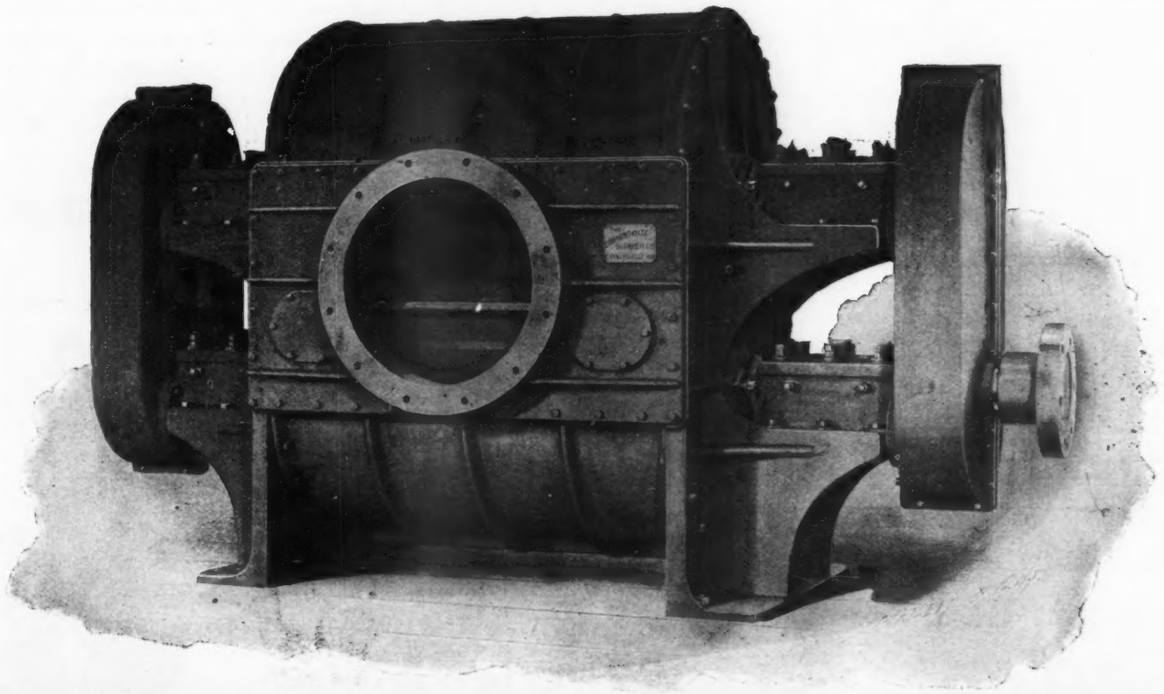
MANUFACTURER OF

ROTARY POSITIVE PRESSURE GAS EXHAUSTERS, BLOWERS AND PUMPS.



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NOTICE OF REMOVAL.

THE **Hazelton Boiler Co.**

FORMERLY

120-122 Liberty St., New York,

Begs to announce that it has Removed its Main Office to the Works,

Rutherford, N. J.,

Where all Correspondence should be Addressed. . .

Rutherford is on Erie R. R., nine miles from New York. Telephone, 6-M Rutherford. October 10, 1901.

The Gas Engineer's Laboratory Handbook.

BY JOHN HORNBY, F.I.C. Price, $2.50.

A. M. CALLENDER & CO., 32 PINE ST., N. Y. CITY.

B-109.

MULLEER

SPECIAL ATTACHMENT GAS TAPPING MACHINE.

By the use of this attachment to our regular pattern machine your service men are exempt from danger of asphyxia, can make more taps a day, and need less help.

CATALOGUES FROM

H. MUELLER MFG. COMPANY,

DECATUR, ILLS.

THE

Ludlow Valve Mfg. Co.,

TROY, N. Y., U. S. A.

Double and Single Gate Valves, ¼" to 72",

—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.

STEWARD SAYS

"ALWAYS STAND UP STRAIGHT"

ALAVA

"ALWAYS STAND UP STRAIGHT"

ADVANTAGES.

That every "ALAVA" CENTER-SUPPORT cap mantle is guaranteed to be everything that is claimed for it. . . . . .

The Best that money and skill can produce. . . . .

SELLERS ARE AUTHORIZED

To refund purchase price to any dissatisfied buyer. . .

Special terms and advertising inducements will be made to GAS COMPANIES or DEALERS of good standing. . . .

REMEMBER:

"THE EARLY BIRD," Etc.

ALAYA Saves mantles because it cannot bend over. . . . .

ALAYA Saves chimneys because it always stands up straight. .

ALAYA Reduces vibration. . . .

ALAYA Is easier to put on lamps.

ALAYA Obstructs NONE of the light.

THESE RESULTS ARE GUARANTEED.

We have been making strictly High-Class E. H. Lava Tips and the Popular STEWARD BURNERS since 1876. Our successes in the past are a criterion of the future.

D. M. STEWARD MFG. CO.

GENERAL OFFICE AND WORKS:
CHATTANOOGA, TENN.
NEW YORK: 107 Chambers Street.

GAS BURNERS,

To burn a given amount at a stated pressure, made to order. Samples furnished. Also, small oil and air valves, slow-feed valves for high pressure, and small brasswork in general.

Drip Pumps, Service Cleaners, Gasfitters' Proving Pumps and Mercury Gauges.

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248 North 8th Street, Philadelphia, Pa.

ALL IRON AND BRASS MOUNTED Valves for Gas.

MANUFACTURED BY

THE KENNEDY VALVE MFG. CO.,

WORKS: COXSACKIE, N. Y.

SALES OFFICE: 68 BEEKMAN ST., N. Y. CITY.

A Large Assortment Carried at our New York Warehouse.

REASONABLE PRICES.
GOOD QUALITY.
PROMPT DELIVERY.

AMERICAN GAS COMPANY

Constructors of Coal Gas Apparatus.

EASTERN AGENTS FOR

BREDEL'S SYSTEM
COAL GAS PLANTS AND GAS APPARATUS.

P. H. & F. M. ROOTS CO.'S
Exhausters, Governors, etc.

GENERAL AGENTS FOR

BRONDER'S CHARGING AND DISCHARGING MACHINES.

AMERICAN GAS COMPANY,

222 South Third Street, Philadelphia, Pa.

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Coal and Water Gas Plants.

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RECUPERATIVE FURNACES, WASHERS, CONDENSERS, PURIFIERS, PURIFYING MACHINES, COKE CONVEYERS, ETC.

SOLE UNITED STATES AGENT FOR
ARROL-FOULIS MECHANICAL CHARGING AND DRAWING MACHINES.

Gas Enriching Plants to Enrich Coal Gas up to 24 Candle Power, and Making a White, Bright, Non-smoking Gas.

GAS RETORTS AND SPECIAL BLOCKS AND FIREBRICK MANUFACTURED UNDER THE SUPERINTENDENCE OF MY OWN CHEMIST.

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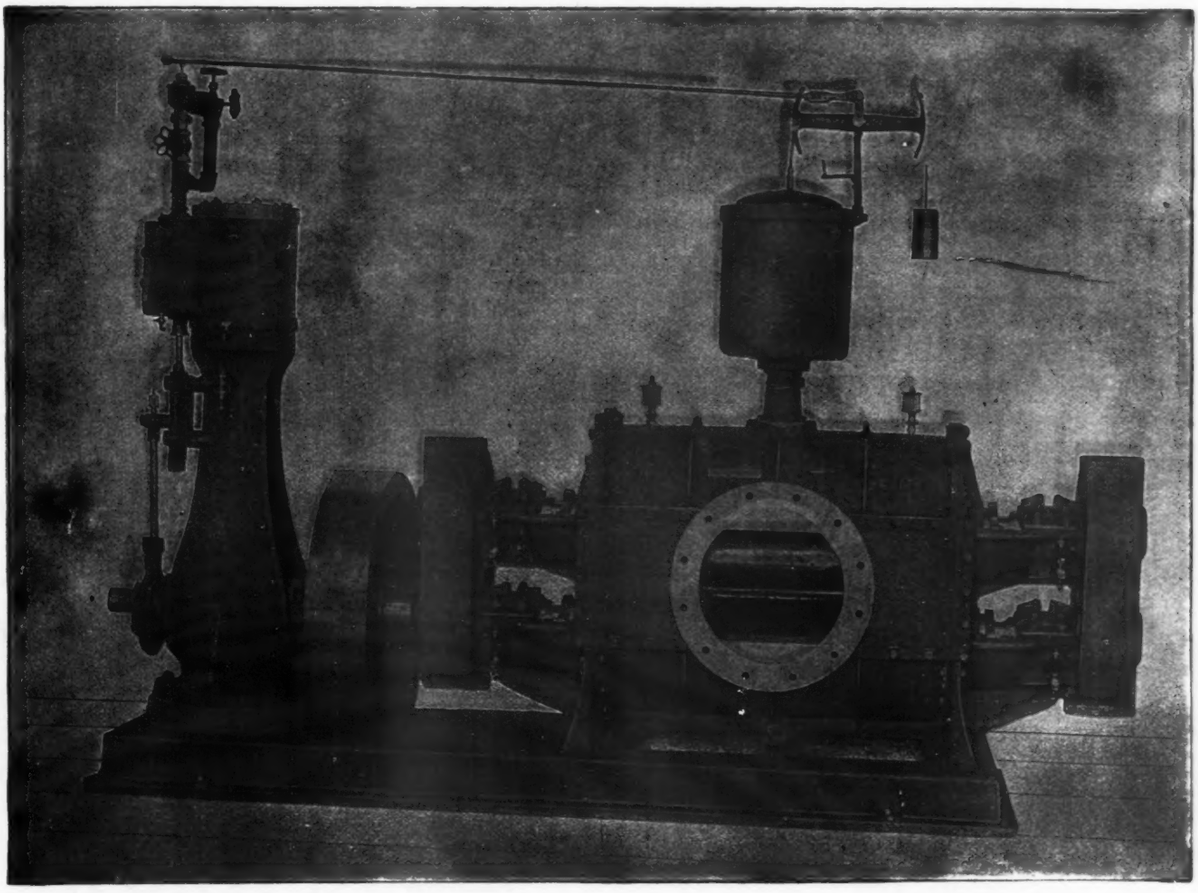
Eastern Agents: AMERICAN GAS CO., Construction Department, 222 So. 3d St., Phila., Pa.

ROOTS'

NEW GAS EXHAUSTER.

Always in the lead. Always anticipating the requirements of the trade. Our new Exhauster meets all demands of modern gas making and overcomes all difficulties heretofore experienced.

OUR GAS GOVERNOR IS MAKING FRIENDS EVERY DAY.



P. H. & F. M. ROOTS CO.,

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American Gas Company,

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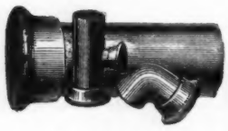
WARREN FOUNDRY AND MACHINE CO.,

Established 1856. Works at Phillipsburgh, N. J.

New York Office, 160 Broadway.



CAST IRON WATER AND GAS PIPE,

FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF

Flange Pipe for Sugar House and Mine Work. Branches, Bends, Retorts, etc., etc.

Highest Award for Pipe Wrenches.

ATLAS PIPE WRENCHES receive HIGHEST AWARD at Pan-American Exposition. If you are not using the "ATLAS" (the Pipe Wrench with the 3-slot adjustment) give it a trial, and we believe you will be satisfied.

Made in four sizes: 16-inch, 18-inch, 24-inch and 36-inch, handling everything from ¾-inch wire to 4½-inch pipe. Ask your Supply man for the "ATLAS."

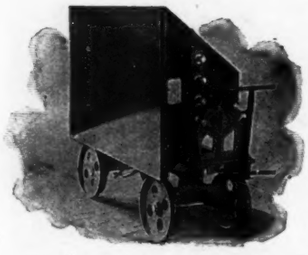
—Manufactured by—

ATLAS PIPE WRENCH CO., 121 Liberty St., New York. 51 Flood Building, San Francisco, Cal.

THE LINK-BELT MACHINERY CO.,

ENGINEERS, FOUNDERS, MACHINISTS,

Chicago, U. S. A.



Tilting Coal and Coke Car.

LINK-BELT ELEVATING & CONVEYING MACHINERY for HANDLING COAL, COKE, OXIDE, ETC.

Tilting Coal and Coke Cars, Breaker Rolls, Power Transmitting Machinery.

Machinery designed and erected to suit existing conditions and available space.

CATALOGUE UPON APPLICATION

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Parson's Steam Blower

FOR IMPROVING BAD DRAUGHT IN BOILERS, AND FOR BURNING BREEZE OR OTHER WASTE MATERIAL.

PARSON'S TAR BURNER

FOR USING COAL TAR AS FUEL.

PARSON'S AIR JET TUBE CLEANER

FOR CLEANING BOILER TUBES.

These devices are all first-class. They will be sent to any responsible party *for trial*. No sale unless satisfactory. Manufactured by the WATERTOWN STEAM BLOWER COMPANY

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"GLOBE" SPECIALS, VALVES, ETC. "GLAMORGAN" PIG IRONS

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CAST IRON FLANGE GAS AND WATER PIPE

GENERAL SALES OFFICE, 192 BROADWAY, NEW YORK.

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MANUFACTURERS OF

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FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

GAS TAPPING MACHINES

—FOR—

Drilling and Tapping Pipe under Pressure

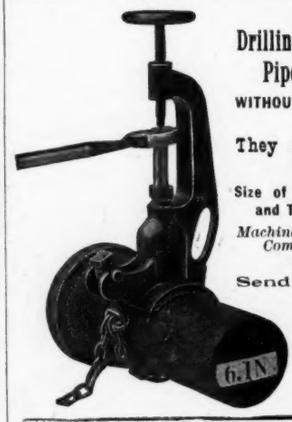
WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.

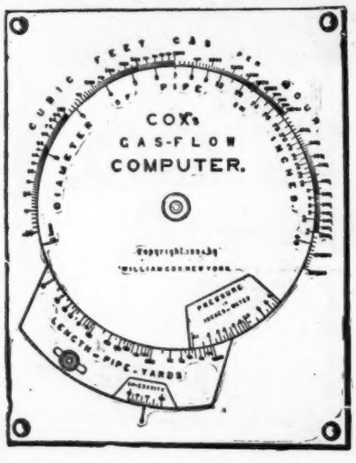


Geo. Light, DAYTON, O.

SAFETY GAS MAIN STOPPER Co.

108 EAST 117TH ST., N. Y.

FOR SHUTTING OFF GAS IN MAINS TEMPORARILY DURING ALTERATIONS AND REPAIRS



Do you wish to Know

what size of Pipe to use to convey any quantity of Gas, any distance, with any loss of pressure, and any initial or final pressure? Then use

COX'S GAS FLOW COMPUTER,

as it gives this information accurately at sight, without mental effort. No calculations needed. Saves time, money and mistakes.

Price, 6.5 x 8 inches, in cloth case, $2.50.

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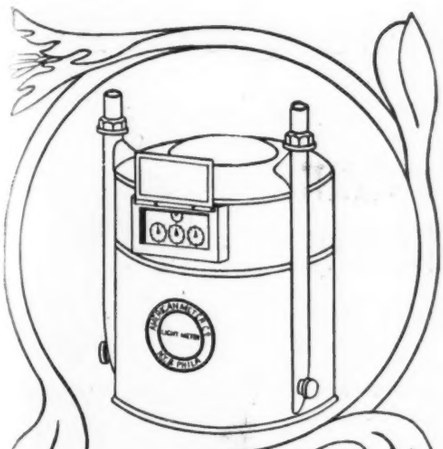
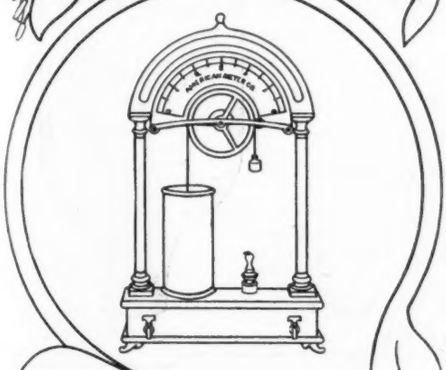
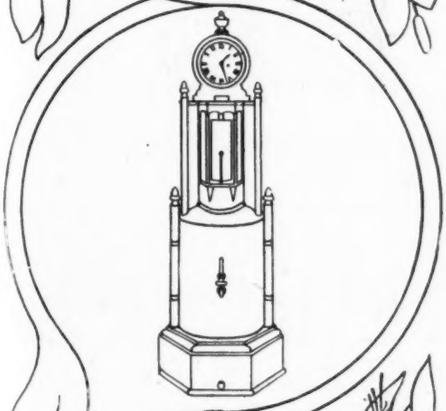
NEW YORK AND PHILADELPHIA,

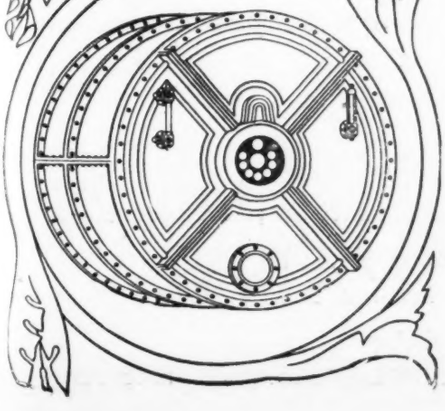
CHICAGO, ST. LOUIS,

SAN FRANCISCO.









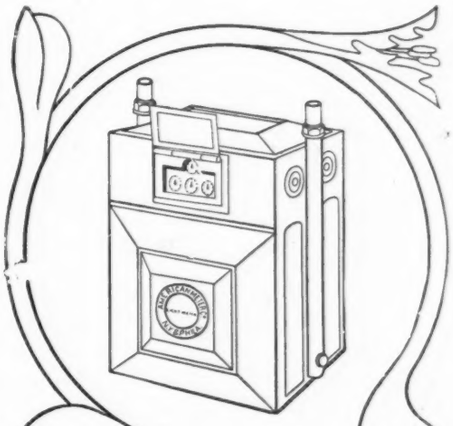
PUBLIC LIGHTING TABLE.

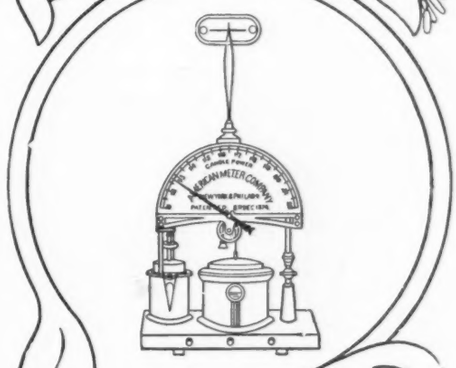
NOVEMBER, 1901.

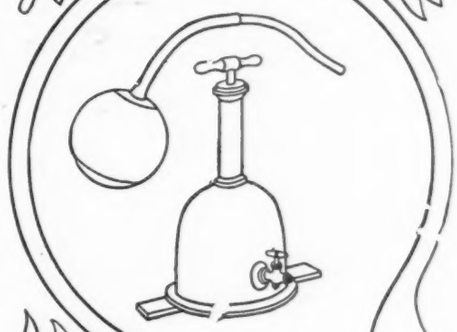
Day of Week.	Table No. 1. FOLLOWING THE MOON. Date.	Light.	Extinguish.	Table No. 2. NEW YORK CITY. All Night Lighting. Light.	Extinguish.
				P.M.	A.M.
Fri.	1	5.30 PM	11.00 PM	4.45	5.35
Sat.	2	5.30 LQ	12.00	4.45	5.35
Sun.	3	5.20	1.10 AM	4.45	5.35
Mon.	4	5.20	2.10	4.45	5.35
Tue.	5	5.20	3.10	4.40	5.45
Wed.	6	5.20	4.10	4.40	5.45
Thu.	7	5.20	5.40	4.40	5.45
Fri.	8	5.20	5.40	4.40	5.45
Sat.	9	5.20	5.40	4.40	5.45
Sun.	10	5.20 NM	5.40	4.40	5.45
Mon.	11	5.20	5.40	4.40	5.45
Tue.	12	5.20	5.40	4.30	6.00
Wed.	13	5.20	5.40	4.30	6.00
Thu.	14	5.20	5.40	4.30	6.00
Fri.	15	7.20	5.40	4.30	6.00
Sat.	16	8.20	5.40	4.30	6.00
Sun.	17	9 20	5.50	4.30	6.00
Mon.	18	10.20 FQ	5.50	4.30	6.00
Tue.	19	11.20	5.50	4.25	6.00
Wed.	20	12.30 AM	5.50	4.25	6.00
Thu.	21	1.40	5.50	4.25	6.00
Fri.	22	2.50	5.50	4.25	6.00
Sat.	23	4.00	5.50	4.25	6.00
Sun.	24	No L.	No L.	4.25	6.00
Mon.	25	No L. FM	No L.	4.25	6.00
Tue.	26	No L.	No L.	4.20	6.10
Wed.	27	5.10 PM	7.30 PM	4.20	6.10
Thu.	28	5.10	8.40	4.20	6.10
Fri.	29	5.10	9.50	4.20	6.10
Sat.	30	5.10	10.50	4.20	6.10

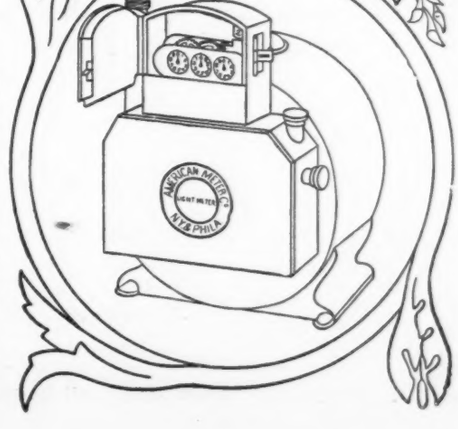
TOTAL HOURS LIGHTING DURING 1901.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	220.10	January	423.20
February	192.30	February	355.25
March	180.00	March	355.35
April	158.30	April	298.50
May	140.40	May	264.50
June	135.40	June	234.25
July	138.00	July	243.45
August	156.20	August	280.25
September	174.40	September	321.15
October	202.30	October	374.30
November	220.40	November	401.40
December	241.30	December	433.45
Total, yr.	2161.10	Total, yr.	3987.45









NEW YORK, 33 Nassau Street. PHILADELPHIA, Broad and Arch Streets. CHICAGO, Foot of Orleans Street. BOSTON, 624 Tremont Building.
CLEVELAND, 809 Cuyahoga Building. ST. LOUIS, 712 Roe Building. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....

No 36.

Controls and Operates the

Welsbach System of Street Lighting,

Which includes its specially DESIGNED AND PATENTED BURNER for STREET and PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

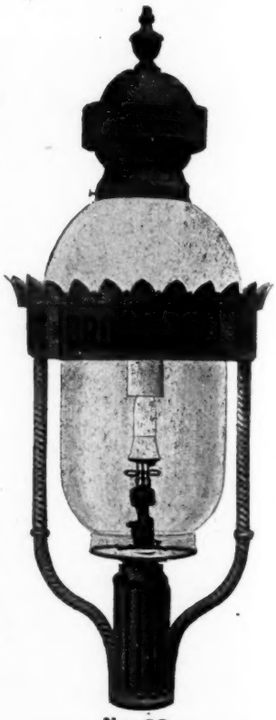
POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others Interested in Municipal and Outside Lighting.



No. 38.

UNIVERSAL WELSBACH BURNER.

The most practical, efficient and artistic burner yet produced. . . . . .

It contains an improved adjustable Bunsen so constructed as to permit of a wide range of variations in gas pressure without blackening the mantles and without an adjustable air shutter. . .

It can be used with all styles and sizes of glassware, either shades or globes. No further necessity to carry a stock of different burners for the many sizes and shapes of glassware.

GAS COMPANIES AND DEALERS CANNOT FAIL TO APPRECIATE THE MANY SALABLE FEATURES OF THIS NEW BURNER.

WELSBACH COMPANY,

GLOUCESTER, N. J. CHICAGO, ILLS.

Salesrooms in all the Leading Cities of the United States.

THE STANDARD DOUBLE SUPERHEATER

LOWE WATER GAS APPARATUS.

Under Contract, 1901:

Number of Sets to August 1, 1901, - - - - - - 27

Total Daily Capacity, - - - - 28,200,000 Cubic Feet

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY Prest. DAVID R. DALY V. Prest. & Treas.
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CLAY GAS RETORTS, FIRE CLAY TILES,
FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

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Brooklyn Fire Brick Works,

MANUFACTURERS OF

CLAY RETORTS, FIRE BRICK,
Gas House and other Tile.

Office, 88 Van Dyke St., Brooklyn, N. Y.

Established 1854. Incorporated 1869.

LACLEDE
Fire Brick Manufg. Co.,

Manufacturers of { GAS RETORTS . .
FIRE BRICK . . .
RETORT SETTINGS

Water Gas Cupola Linings, Fire Clay, Etc.

Proprietors for the U. S., Coze System of Inclined Benches.

Estimates Furnished on Application for Most Successful Style of Construction.

Also for Free-Firing and Full and Half-Depth Regenerative Benches, for Burning either Coal or Coke in the Furnaces.

Office: 914, 915 & 916 Wainwright Building, St. Louis, Mo.

The Gas Engineer's Pocket-Book,

By HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works.

PRICE, $3.50.

A. M. CALLENDER & CO., 32 Pine Street, New York City.

Adam Weber Sons,

Manhattan Fire Brick and Enameled Clay Retort Works.

Works, Weber, N. J.

Office, 633 East 15th St., New York.

Modern Recuperative Furnaces.

Standard Fire Brick and Gas Retorts.

ISAAC C. BAXTER, President.

Works,
LOCKPORT STATION, PA.

—ESTABLISHED 1864.—

JAMES GARDNER, JR., CO.,

Successor to WILLIAM GARDNER & SON,

PETER YOUNG, Sec'y and Treas.

Address all communications to JAMES GARDNER, JR., CO., Box 277, JOHNSTOWN, PA.

Fire Clay Goods for Gas Works.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.
OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,
BENCH SETTINGS,
Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. Galesburg, Ills., or Buffalo, N. Y.
In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD, Galesburg, Ills.

For orders East of Buffalo, N. Y., or Pittsburg, Pa., freight will be paid to these points.

Parker-Russell Mining and Mfg. Co.,

CITY OFFICE,
417 Pine Street, St. Louis, Mo.

PROPRIETORS OF THE

OAKHILL GAS RETORT & FIRE BRICK W'KS

Our immense establishment is now employed almost entirely in the manufacture of

Materials for Gas Companies

We have studied and perfected three important points. Our retorts are made to stand changes of temperature, the strongest heats of the furnace, and the abrasion of feeding and emptying. We construct

Half and Full Depth Benches of Our Own Design,

Containing 6, 8 or 9 Retorts.

We have Greatly Improved our Recuperators. Coal or Coke can be used as Fuel in Furnaces.

THEO. J. SMITH, Prest. J. A. TAYLOR, Sec.
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BALTIMORE
RETORT & FIRE BRICK CO.

MANUFACTORY AT
LOCUST POINT, BALTIMORE, MD.

Clay Retorts, Blocks & Tiles

FIRE BRICK, FIRE CLAY,
AND FIRE CEMENT.

Our Improved Half and Full Depth Benches have been Adopted by Many Gas Companies.

WALDO BROS., 102 MILK ST., BOSTON, MASS.

Sole Agents for New England States.

JOHN DELL,
General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are prepared to furnish and erect COMPLETE, Half and Full Depth Benches of 6's, 8's, 9's, with Regenerative Furnaces, Constructed to Burn either Coal or Coke. Also Plain Benches.

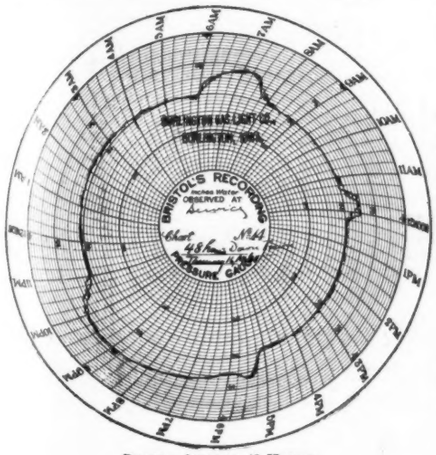
CORRESPONDENCE IS RESPECTFULLY SOLICITED.

{ CITY OFFICE: 411 Olive St., Continental Bank, } ST. LOUIS, MO.

A GAS GOVERNOR,

Particularly a CONNELLY Gas Governor,

Is as essential to the operation of a gas works as the Governor of any of our great States is necessary to the successful working of one of these political bodies.



DOUBLE RECORD 48 HOURS.

BURLINGTON GAS LIGHT CO., 215 Jefferson Street, Burlington, Iowa, April 8, 1901.

MR. S. F. HAYWARD, Mgr. Connelly Iron Sponge and Governor Co., New York:

Dear Sir: You are at liberty to keep the pressure sheets sent you recently. If my testimony would have any weight with your prospective customer, you might tell him that all that is necessary to make a CONNELLY Governor just as automatic as the charts we send you indicate, 24 hours in the day and 365 days in the year, is to spend about a half hour's time each YEAR cleaning it. Yours truly, E. D. CLARY, Supt.

Mr. Clary is only one of scores of gas managers who find Connelly Governors absolutely indispensable. We are in business to give you all the information you can wish about Governors.

Connelly Iron Sponge and Governor Co.,

395 BROADWAY, NEW YORK.

ADAM WEBER SONS,

Manhattan Fire Brick & Enameled Clay Retort Works,

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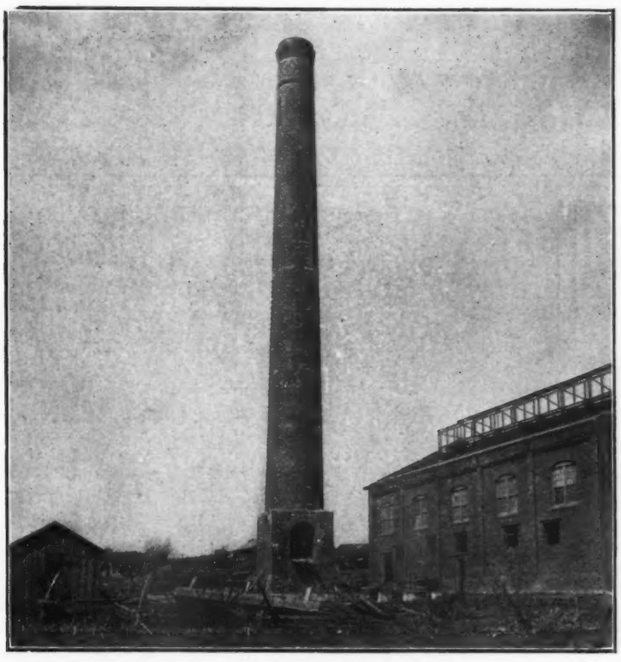

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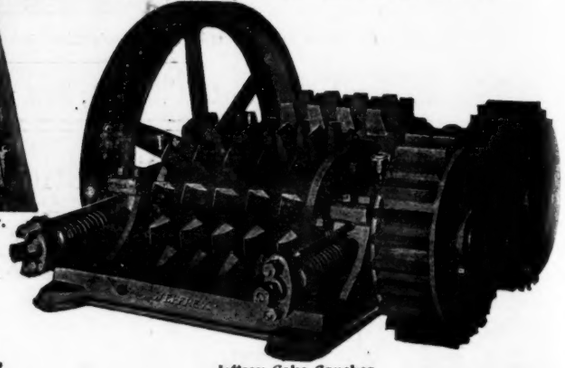

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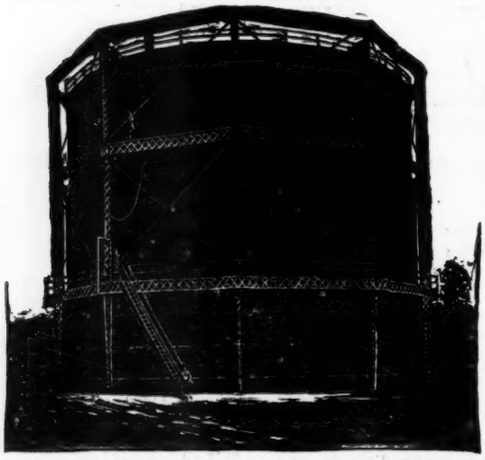

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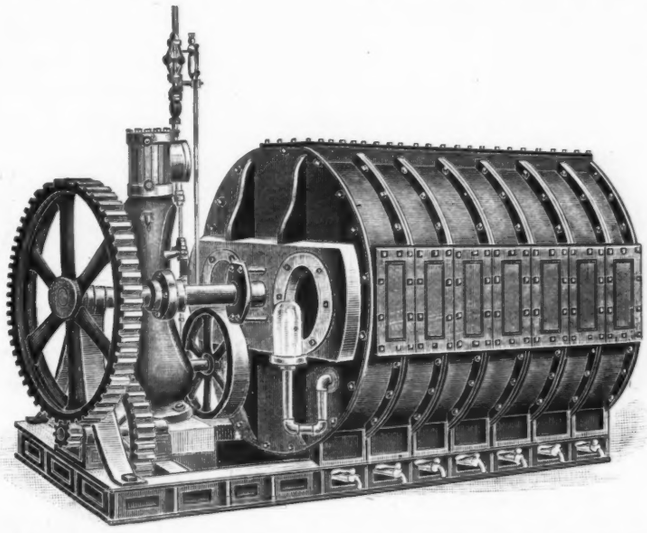

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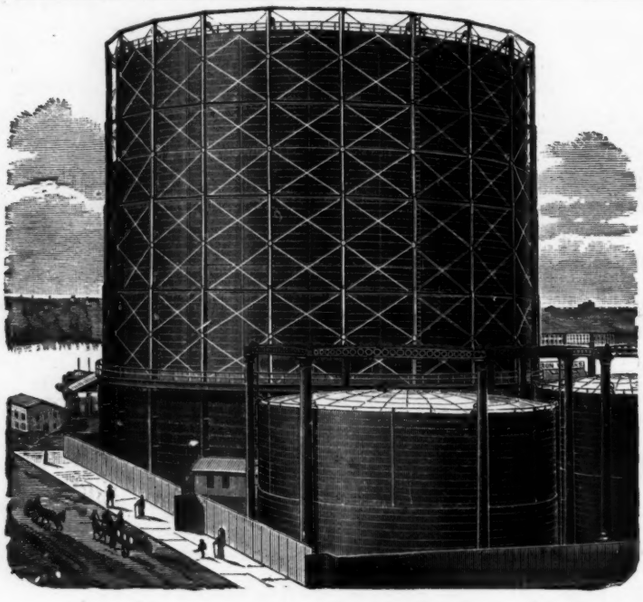

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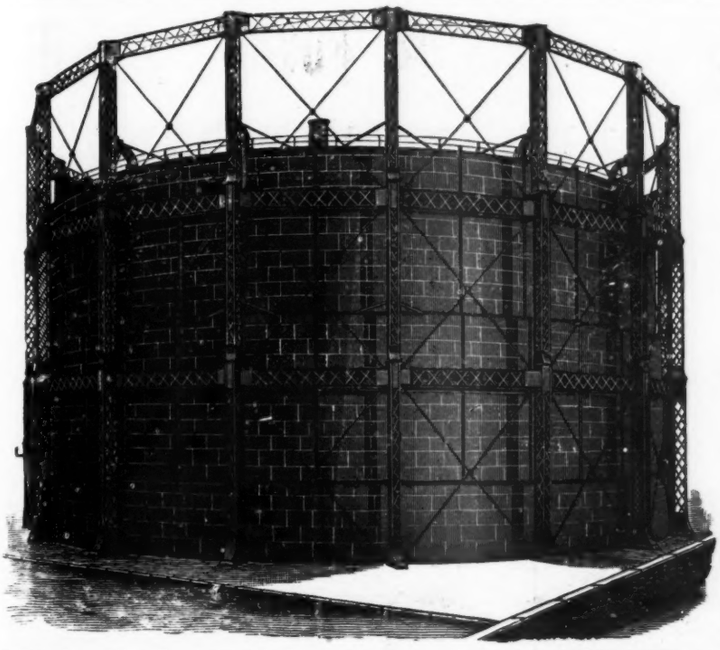

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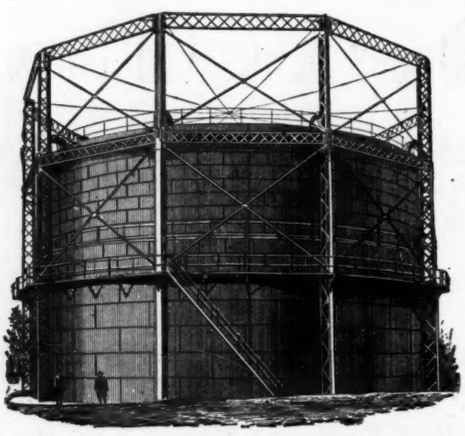

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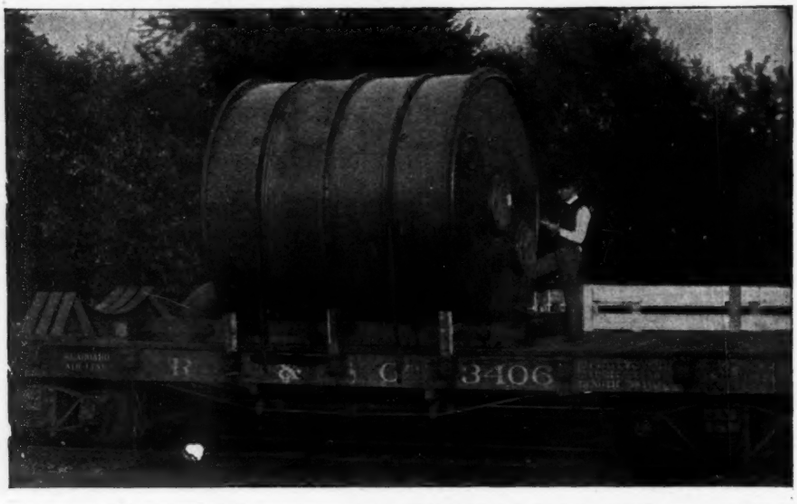

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